ENGINEERING EXHIBITS
IN SUPPORT OF COMMENTS OF
THE AM RADIO PRESERVATION ALLIANCE
IN MB DOCKET NO. 13-249

WLAC(AM), Nashville, Tennessee

JANUARY 2019

The attached engineering exhibits have been prepared on behalf of the AM Radio Preservation Alliance (AMRPA) to document the impact on AM radio service during nighttime, critical hours and daytime operations, respectively, if certain changes to the AM protection rules currently enforced by the Federal Communication Commission (FCC), under consideration in MB Docket No. 13-249, were adopted.[1] These exhibits clearly validate that there would be minimal theoretical gains in radio service provided by other AM stations at the expense of new interference to vastly more populations currently reached by established Class A AM radio service.

In this set of engineering exhibits, interference and coverage studies were conducted analyzing Class A AM Station WLAC, Nashville, Tennessee, FCC Facility ID No. 34391, in regard to its nighttime (Figures 1-N through 14-N), critical hours (Figures 1.1-C through 2.3-C) and daytime operations (Figures 1-D through 7-D), applying the FCC's reduced protection requirements to Class A AM stations as proposed in the *SFNPRM*.[2]

As detailed further below, Figure 1-N documents the negative impact on the studied Class A AM station's nighttime signal from nearby non-Class A AM stations adding nighttime coverage assuming the *SFNPRM*'s Alternative 1 for nighttime hours protection to Class A AM stations (protection of 0.5 mV/m groundwave contour) was adopted, while Figures 2-N through 14-N show the theoretical additional service if neighboring non-Class A AM stations were to add nighttime coverage under Nighttime

[1] *See Revitalization of the AM Radio Service*, Second Further Notice of Proposed Rulemaking, FCC 18-139, MB Docket No. 13-249 (rel. Oct. 5, 2018) ("*SFNPRM*").

[2] These interference studies were conducted using computer software V-Soft AMpro2's incoming interference study program, combining interfering signal strength using the RSS methodology with a 50% minimum level for inclusion and a buffer grid size of 500x500.

Alternative 1.[3] Following these figures are contour maps (prepared by iHeartMedia's engineering staff) mapping these non-Class A AM station's theoretical nighttime AM gain areas in comparison with such station's licensed or permitted FM translator service area (60 dBu contour), where applicable,[4] along with a chart summarizing the actual FM translator population served in contrast to the theoretical nighttime AM gains coming at the expense of more interference on the AM band.

Figures 1.1-C, 1.2-C and 1.3-C address the studied Class A AM station during critical hours periods under Alternative 1 (Class A AM stations afforded no protection from other AM stations during critical hours). Figures 2.1-C, 2.2-C and 2.3-C document the studied Class A AM station during critical hours periods under Alternative 2 of the *SFNPRM* (protection of a Class A AM station during critical hours only to its 0.5 mV/m groundwave contour by amending 47 C.F.R. Section 73.190 critical hours figures to reference the distance from the Class A AM station's 0.5 mV/m contour in lieu of its 0.1 mV/m contour). These Critical Hours Alternative 1 and Alternative 2 studies reflect increasing interference (shaded red) to currently served populations by the studied Class A AM station at the intervals of one-hour, one-half hour, and one-quarter hour before sunset.

Daytime operations under the *SFNPRM* proposal are addressed in Figures 1-D through 7-D. Figure 1-D documents the daytime operations of the studied Class A AM station as currently protected (to its 0.1 mV/m daytime groundwave contour), as well

3 Based on a sampling analysis, *SFNPRM* Nighttime Alternative 2 generally is expected to authorize even more interference to the listeners of Class A AM stations than pursuant to *SFNPRM* Nighttime Alternative 1.

[4] In situations where the non-Class A AM station has more than one FM translator authorization, only the FM translator facility closest to the theoretical nighttime AM gain area has been mapped.

as the predicted interference within that contour that would result if nearby AM stations operated with the maximum powers permitted in the direction of the studied Class A AM station as proposed in the *SFNPRM* (protecting only the 0.5 mV/m daytime groundwave contour of the Class A AM station). Figures 2-D through 7-D document the potential daytime population gain – solely in the direction of the studied Class A AM station as other stations may limit power gains in other directions – for the individual interfering stations, assuming the daytime protection to only the 0.5 mV/m groundwave contour was adopted as proposed in the *SFNPRM*.

Following the Figures are charts tabulating the results of these nighttime, critical hours and daytime studies.

In addition, the summary pages of the "Grid Based Incoming Interference Population Report(s)" conducted for the nighttime, critical hours and daytime analysis of the studied Class A AM station are also attached. Due to their length, only the summaries, and not the entire Grid Based Incoming Interference Population Report(s) are attached; the entire Report(s) are available upon the request of the FCC or any interested party.

Below is a summary of the methodology of the conducted coverage and interference studies in regard to the studied Class A AM station as documented in the attached figures and charts:

Nighttime

Figure 1-N maps the studied Class A AM station's nighttime 0.5 mV/m 50% skywave contour (red line), which is currently protected, along with the Class A AM station's nighttime 0.5 mV/m groundwave contour (blue line) which is proposed to be protected under Nighttime Alternative 1 of the *SFNPRM*. The resulting zone subject to new interference from co-channel Class D stations adding nighttime operations is shown in

red shading, and the currently-served population and population subject to such new interference are detailed in the box on the upper left-hand of Figure 1-N. In determining the interference to the studied Class A AM station, the nighttime operation for each impinging Class D AM station is based on protecting the 0.5 mV/m groundwave contour of the studied Class A AM station pursuant to Nighttime Alternative 1 of the *SFNPRM*. Generally, the impinging Class D AM stations are non-directional. In those few instances where the Class D AM station employs a directional pattern, the presumed Class D AM station power has been limited in the direction of the studied Class A AM station's 0.5 mV/m groundwave contour and has not been verified for protection limits in other directions.

Figures 2-N through 14-N show the nighttime interference-free contour for each co-channel Class D interfering AM station assuming nighttime operations with maximum permissible power, while protecting only the nighttime 0.5 mV/m groundwave contour of the studied Class A AM station pursuant to Nighttime Alternative 1 of the *SFNPRM*. The potential nighttime population and area gains resulting from such co-channel Class D stations operating with maximum allowed power in the direction of the studied Class A AM station's protected 0.5 mV/m groundwave contour is also detailed in the box in the upper right-hand of each figure. A tabulation of the nighttime study results is provided following all the figures.

Critical Hours

Figures 1.1-C through 1.3-C and Figures 2.1-C through 2.3-C each show the daytime 0.1 mV/m groundwave contour (blue line) and the 0.5 mV/m groundwave contour (red line) of the studied Class A AM station. There are three studies in each set, employing skywave diurnal factors (FCC Section 73.190 Figure 13) for the time frames of (i) one hour prior to sunset (SS-1), (ii) ½ hour prior to sunset (SS-0.5), and (iii) ¼ hour prior to sunset (SS-0.25). Predicted interference within the respective contours is shown in red shading.

Under Critical Hours Alternative 1 of the *SFNPRM,* neighboring stations to a Class A AM station (which in this instance are Class D stations) could continue to operate at full daytime power during critical hours. The interference to the studied Class A AM station from such unrestricted power operations of its neighbors during critical hours per Alternative 1 of the *SFNPRM* is documented in red shading on Figures 1.1-C, 1.2-C and 1.3-C, for each respective time period (one hour, ½ hour and ¼ hour prior to sunset).

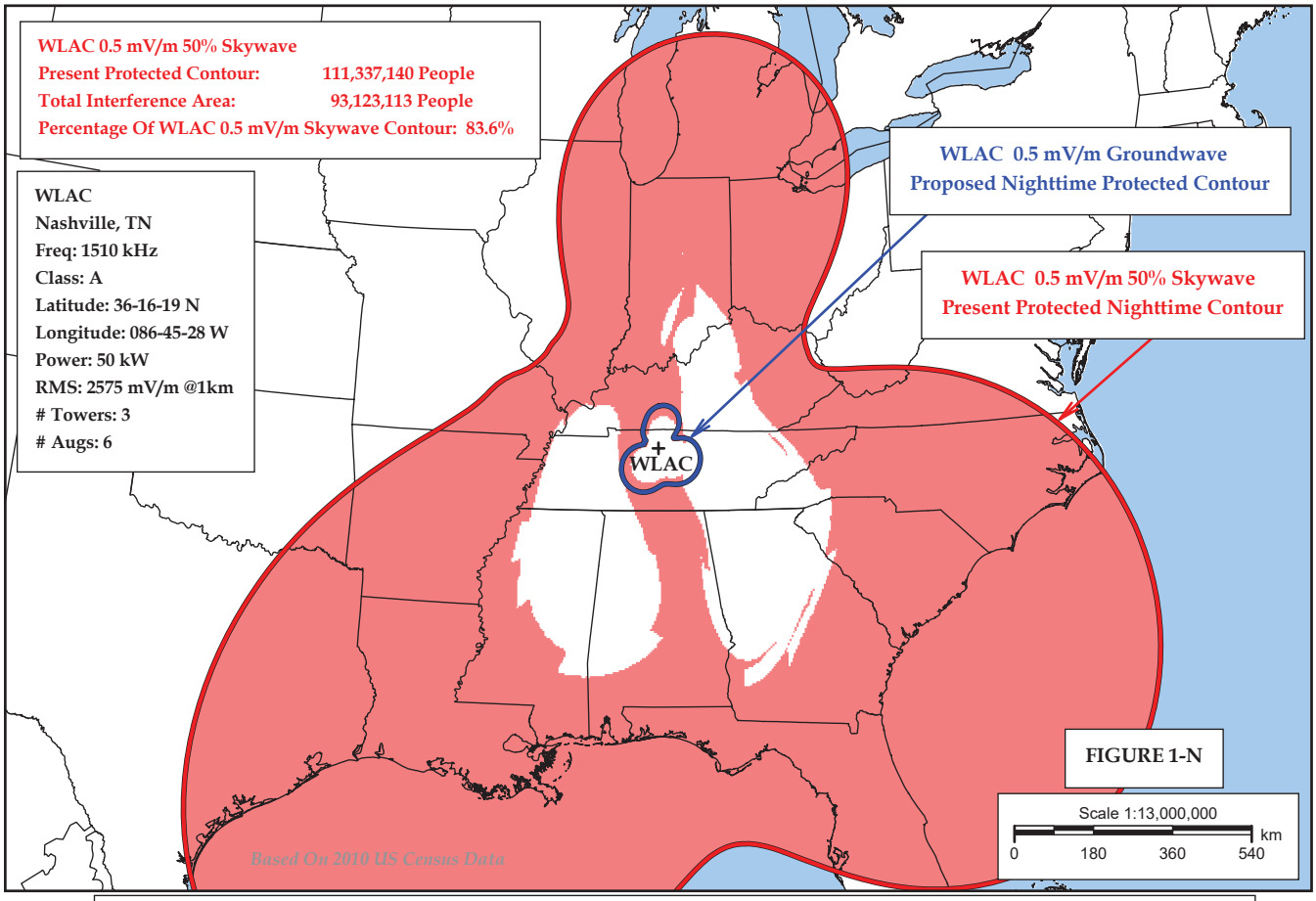
Pursuant to Critical Hours Alternative 2 of the *SFNPRM*, the Commission would change the vertical axis reference for application of Figures 9, 10 and 11 of 47 C.F.R. Section 73.190 from "Distance from 0.1 mV/m Contour in Miles" to "Distance from 0.5 mV/m Contour in Miles." The interference to the studied Class A AM station from such revised permissible power calculations for its neighbors during critical hours per Alternative 2 of the *SFNPRM* is documented in red shading on Figures 2.1-C, 2.2-C and 2.3-C, for each respective time period (one hour, ½ hour and ¼ hour prior to sunset).

The box on the upper left-hand corner of each figure sets forth the data for the population, area and percentage impact of this interference, if authorized by the proposed change in the critical hours protections on the studied Class A AM station's 0.1 mV/m contour; the box on the upper right-hand corner, on the studied Class A AM station's 0.5 mV/m contour. A tabulation of the critical hours study results is provided following all the figures.

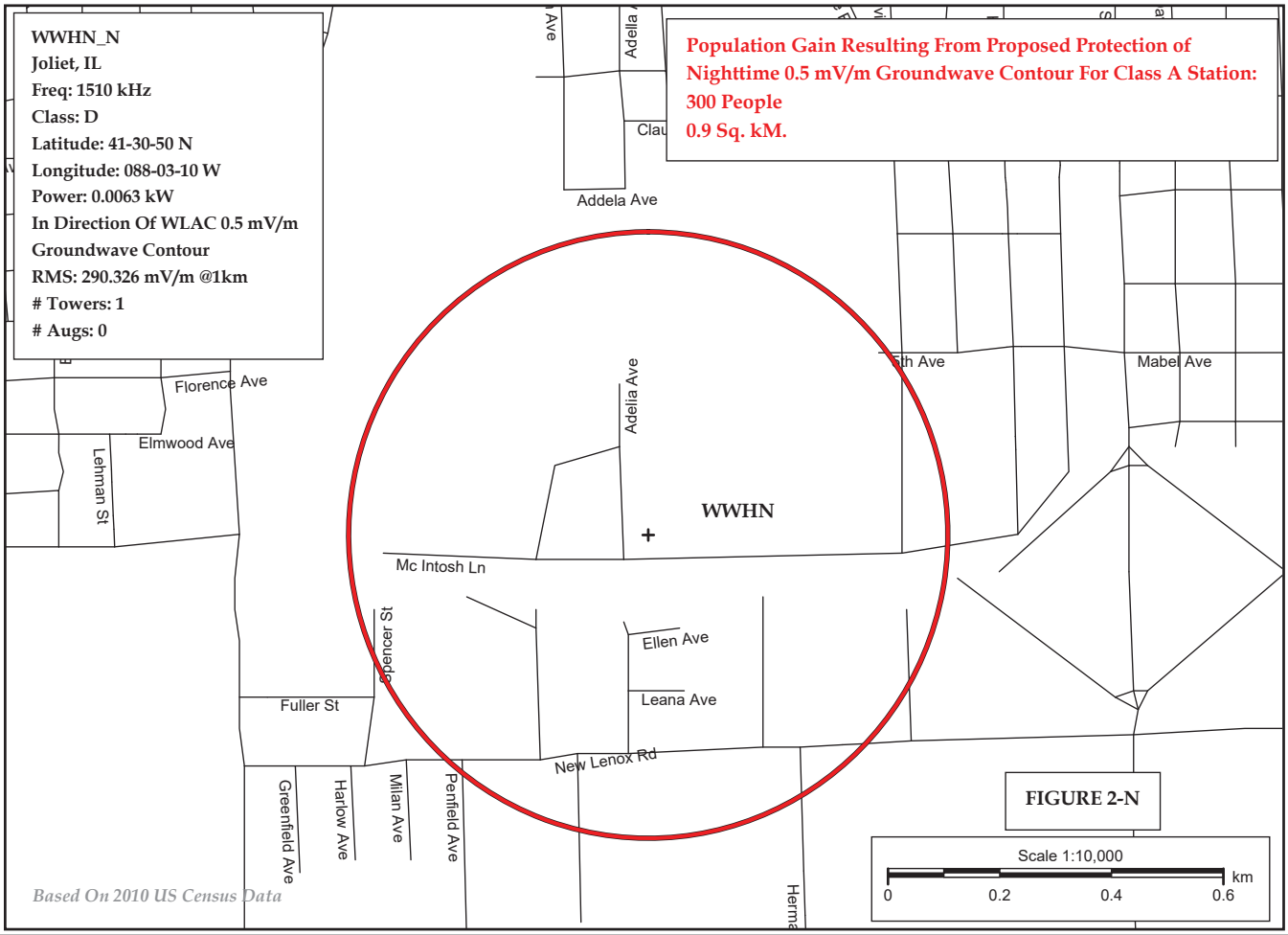
Daytime

For the studied Class A AM station, Figure 1-D maps the present daytime protected 0.1 mV/m groundwave contour (blue line) as well as the less-encompassing daytime 0.5 mV/m groundwave contour (red line) proposed to be protected from co-channel interference in the *SFNPRM*. The interference area resulting from nearby co-channel stations (typically Class D AM stations) operating with maximum potential power (up to 50 kW) in the direction of the studied Class A AM daytime 0.5 mV/m groundwave contour is shown in red shading. The box at the upper right-hand corner of Figure 1-D details the currently protected population within the studied Class A AM station's daytime 0.1 mV/m groundwave contour, the population within that contour that would be subject to interference if only the daytime 0.5 mV/m groundwave contour is protected as proposed in the *SFNPRM*, and the percentage of the current population now served that such interference zone encompasses.

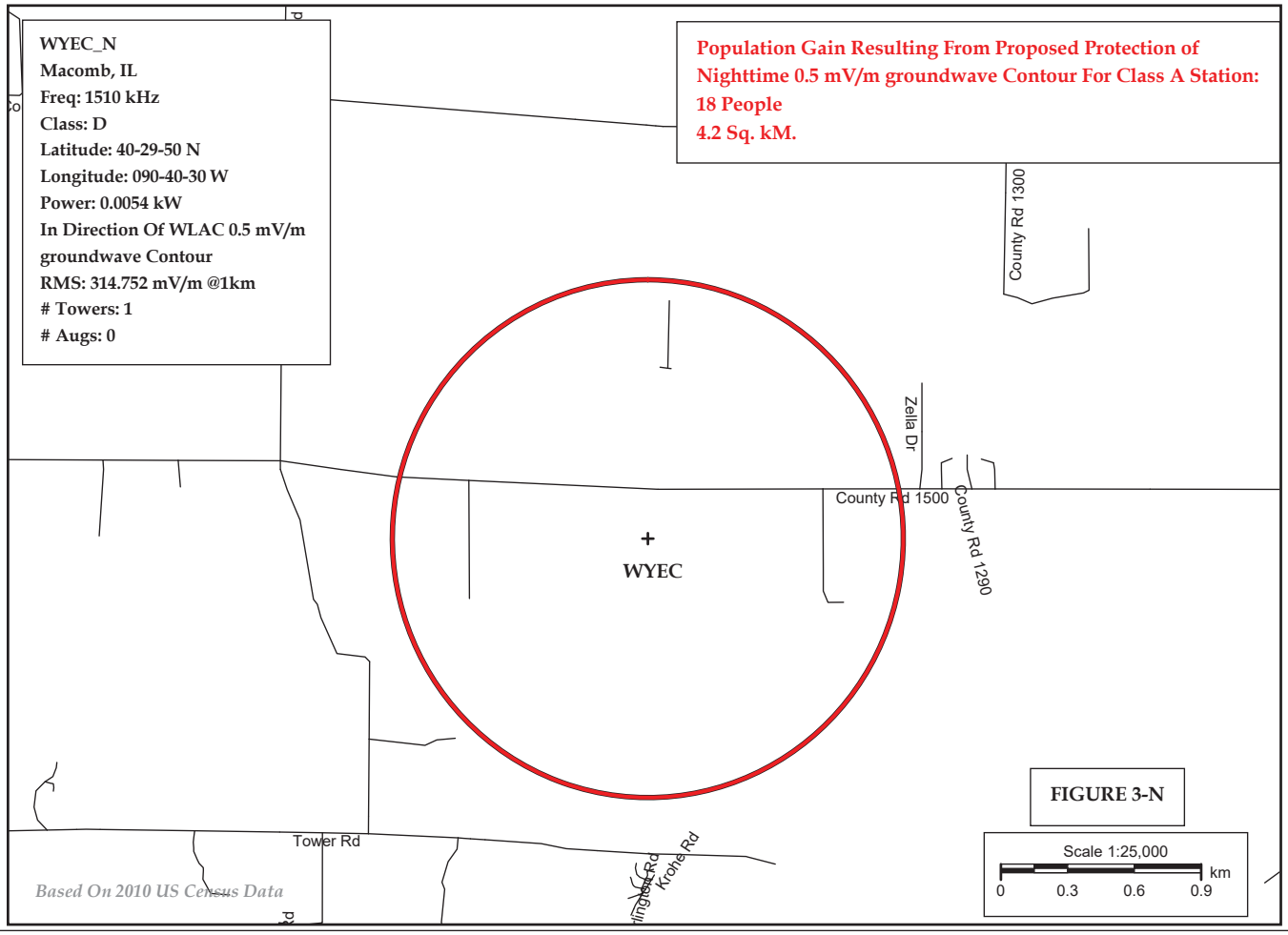
Figures 2-D through 6-D document the potential daytime population gain for the individual interfering stations in the direction of the studied Class A AM station with daytime protection to the Class A AM station's 0.5 mV/m groundwave contour, as proposed in the *SFNPRM*. The boundaries for the gain areas are the difference between the licensed and potential 0.5 mV/m groundwave contours of the interfering station through the arc of the Class A AM station's protected 0.5 mV/m groundwave contour, as detailed on each of Figures 2-D through 6-D. Individually and collectively, the potential daytime population gains by the interfering stations in the direction of the now-limiting Class A AM station under the *SFNPRM* daytime proposal constitutes a tiny percentage of the population that would be subject to new interference to their daytime reception of the studied Class A AM station. A tabulation of the daytime study results is provided following all the figures.



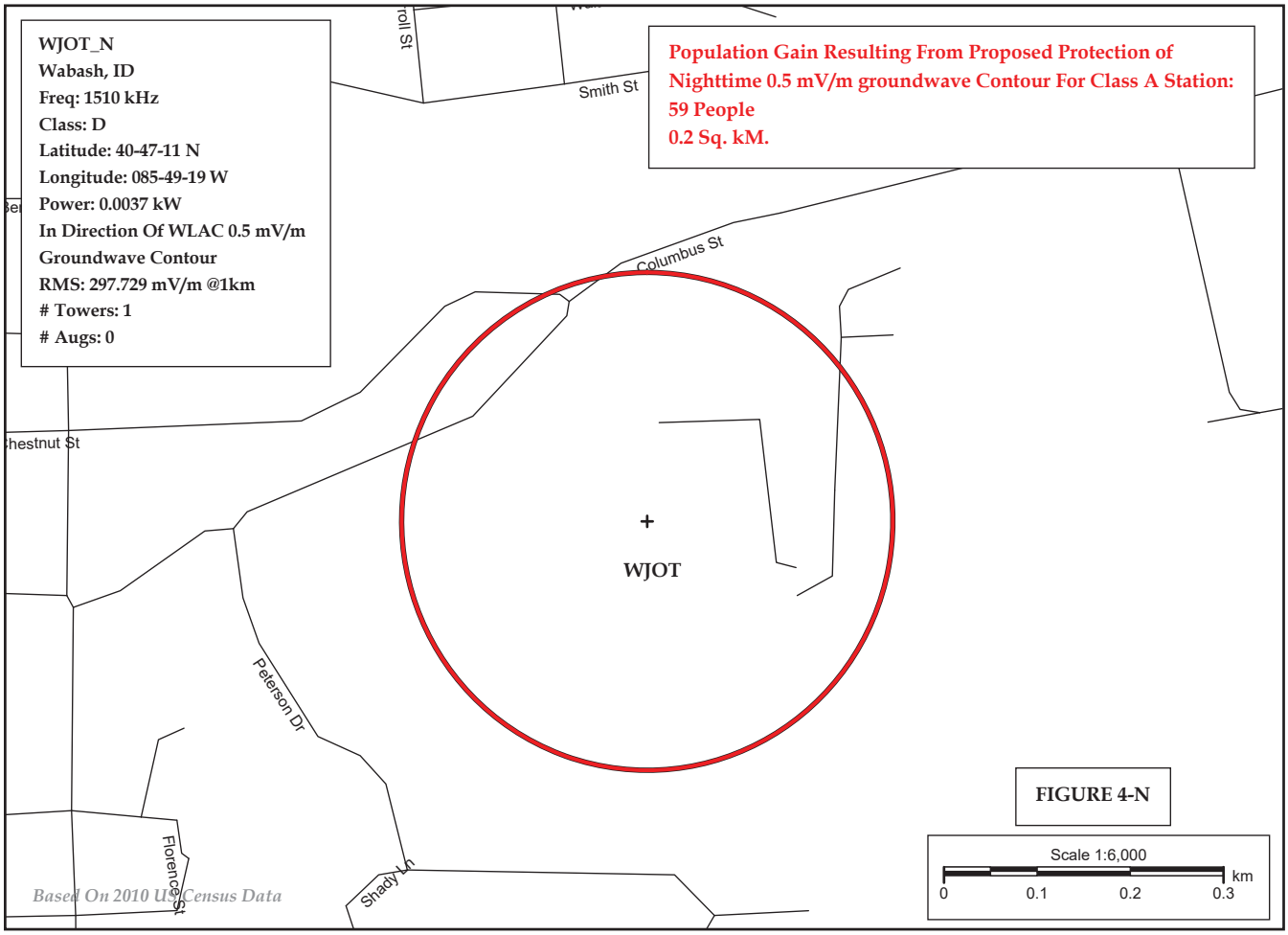
Predicted Nighttime Interference Area To The Present Protected WLAC 0.5 mV/m 50% Skywave Nighttime Contour From Class D Stations WWHN, WYEC, WJOT, WLKR, WQUL, WQQW, KMRF, WEAL, WLGN, KWJB, KAGY, WWBC And KAGC Operating With Maximum Allowed Power In The Direction Of WLAC's 0.5 mV/m Groundwave Contour



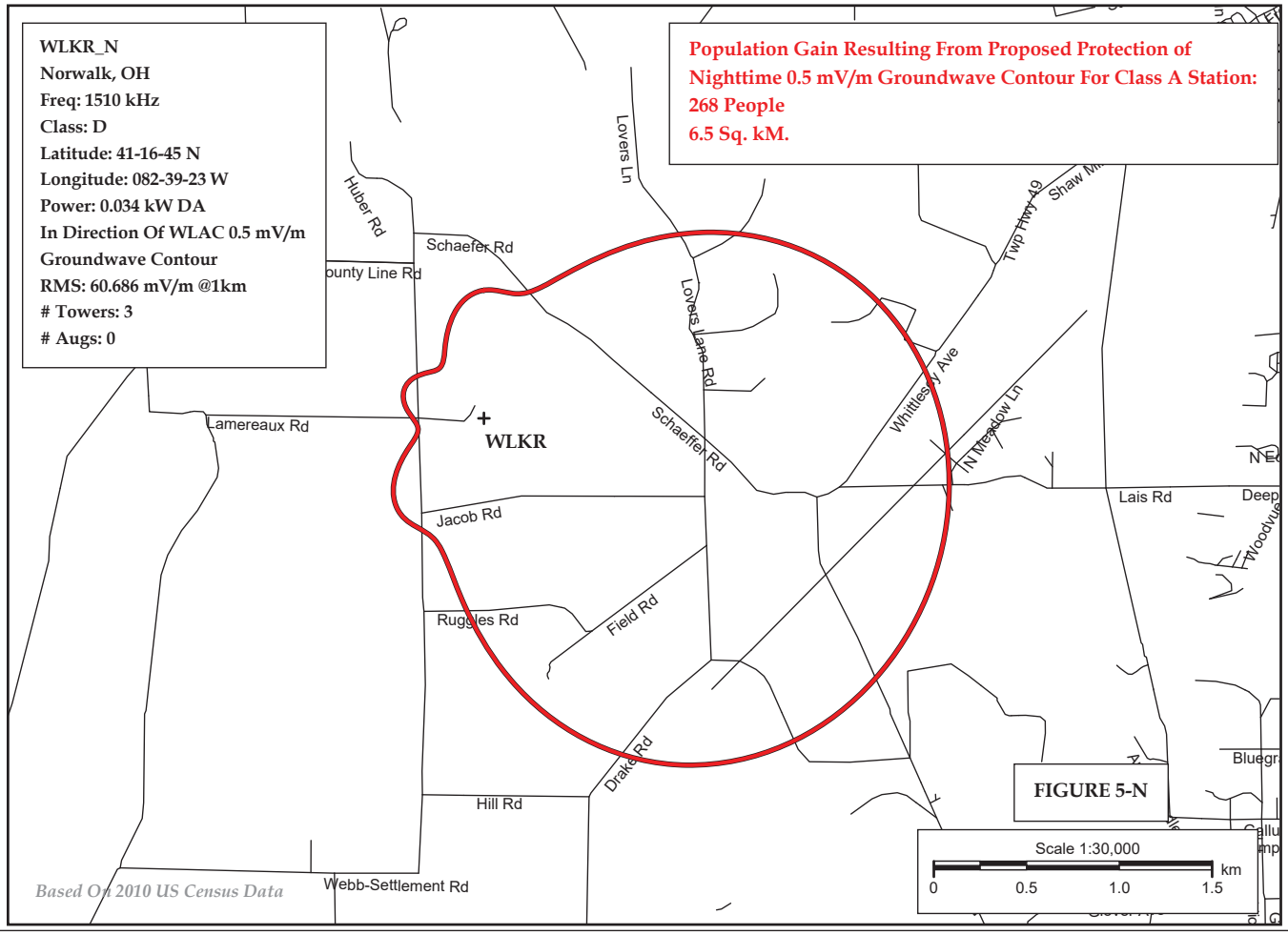
WWHN NIF 41.3 mV/m groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m groundwave Nighttime Contour



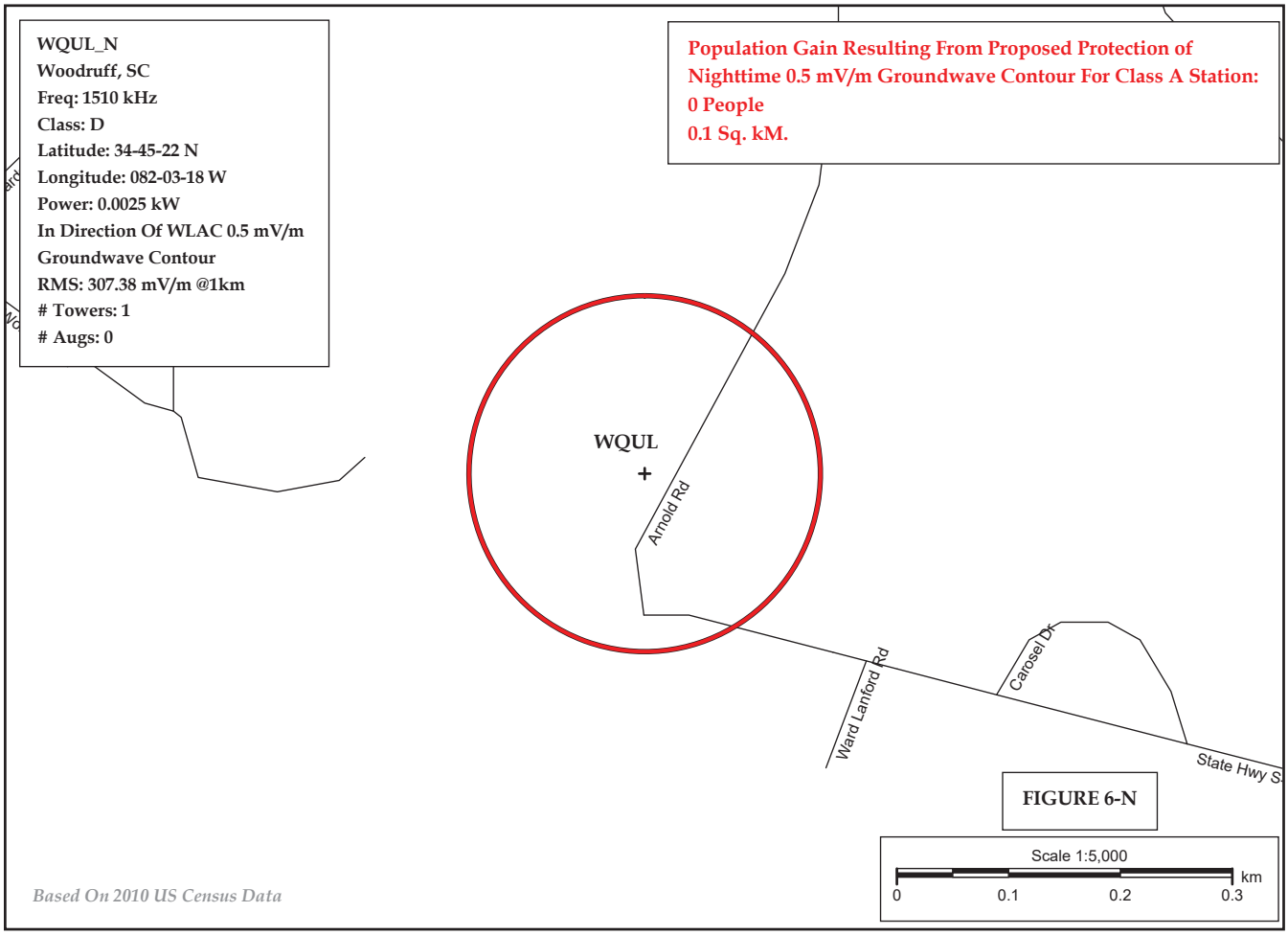
WYEC NIF 17.5 mV/m groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m groundwave Nighttime Contour



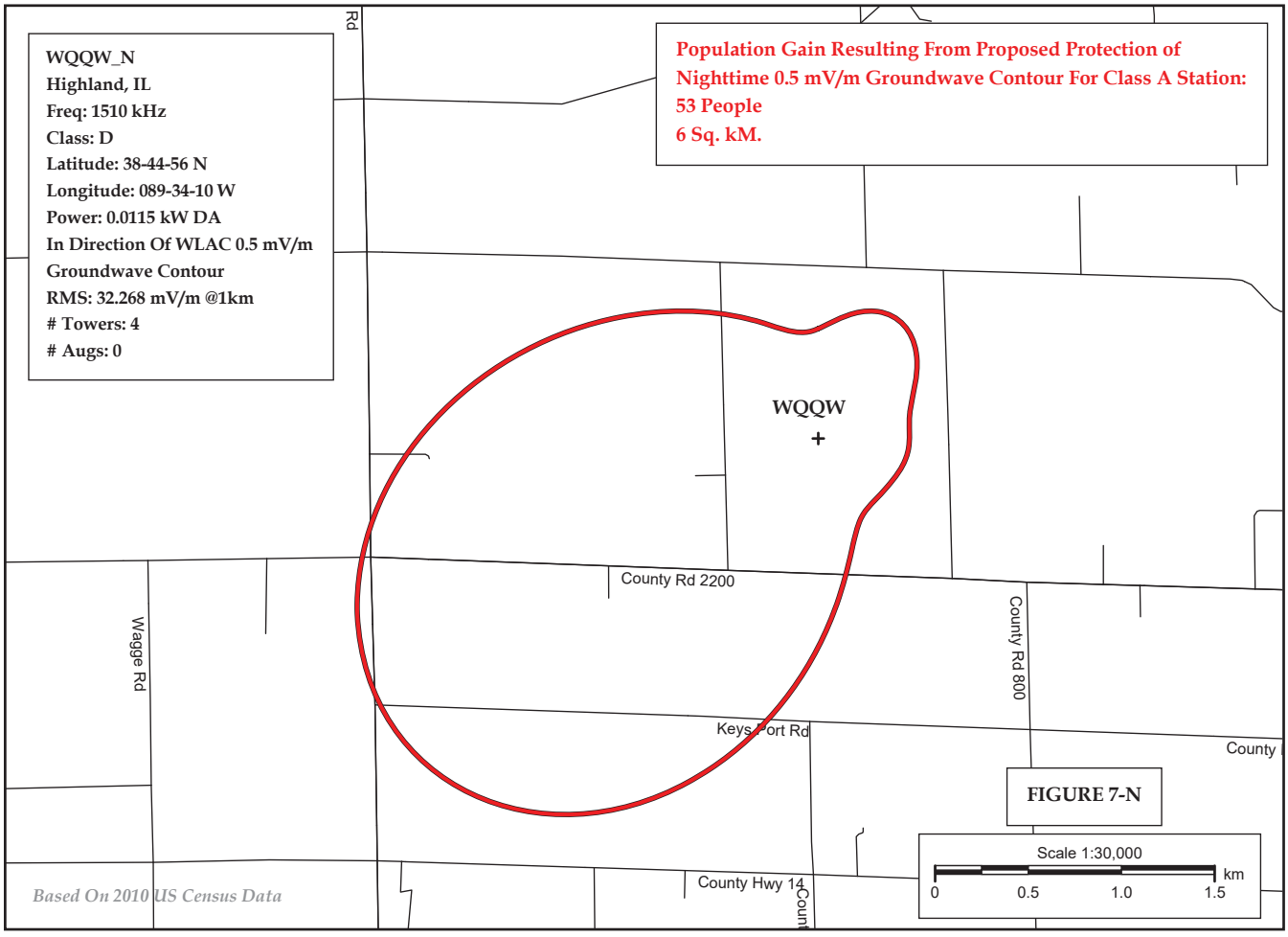
WJOT NIF 65.3 mV/m groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m groundwave Nighttime Contour



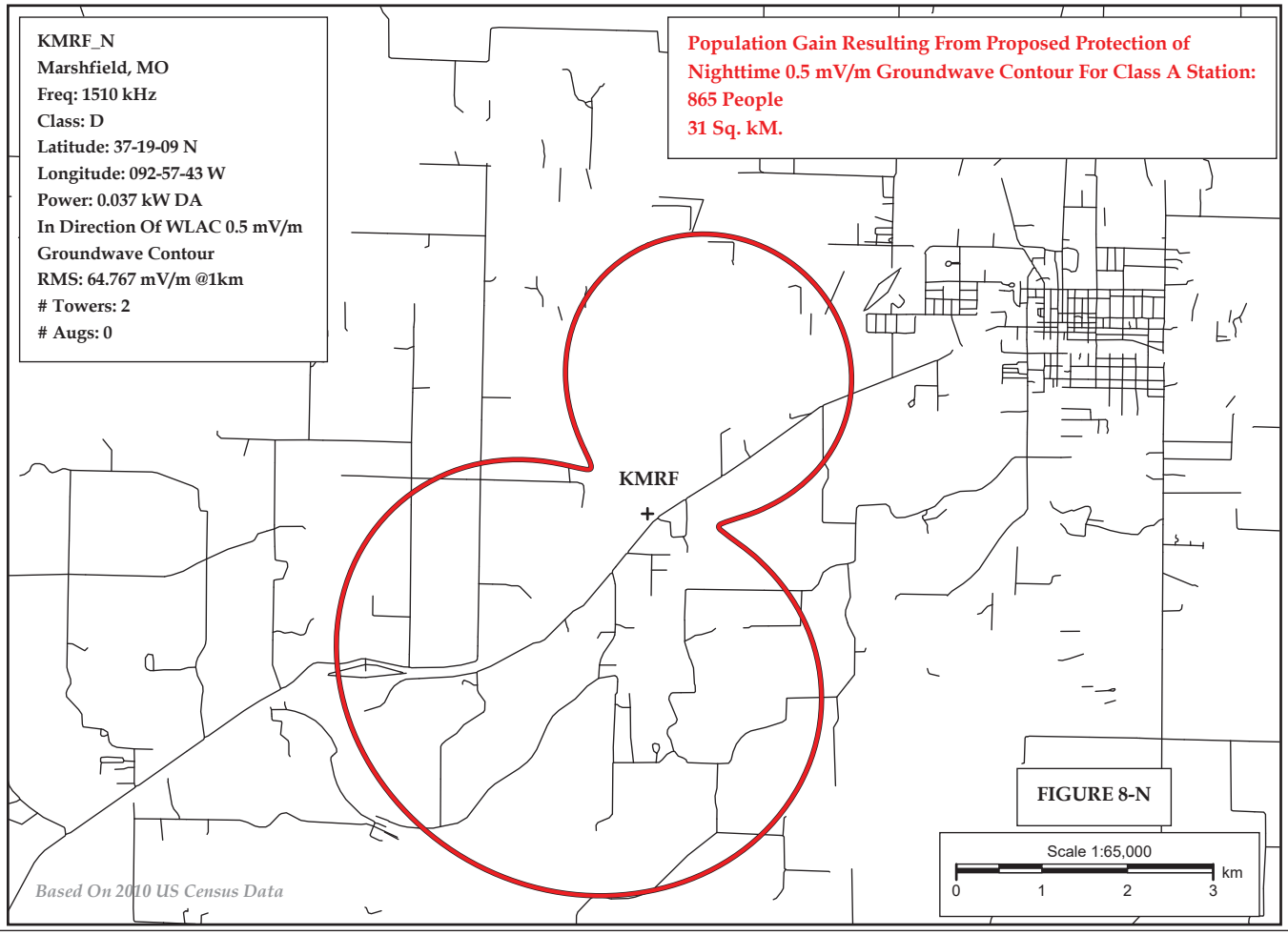
WLKR NIF 36.2 mV/m groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m groundwave Nighttime Contour



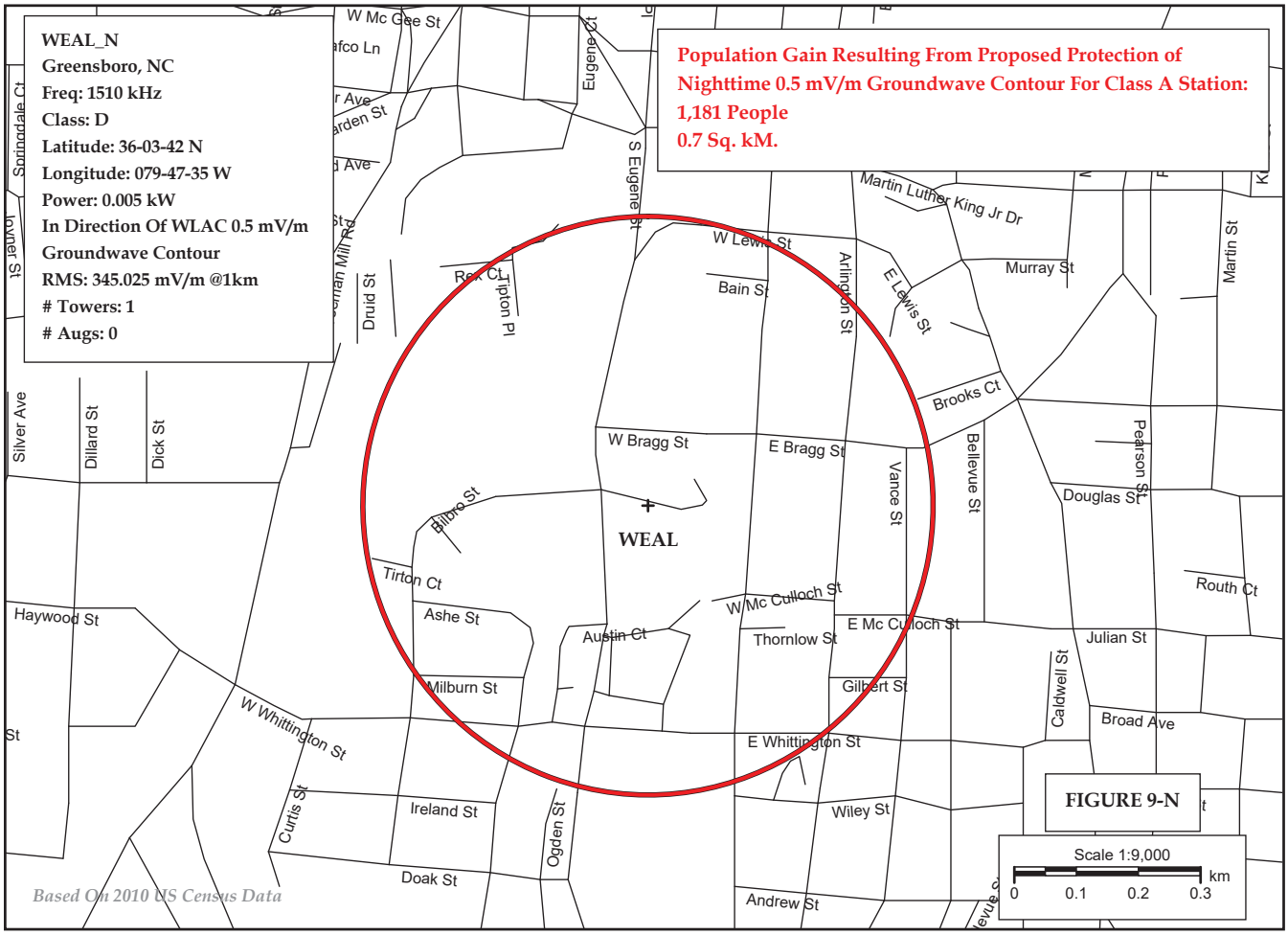
WQUL NIF 81.9 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



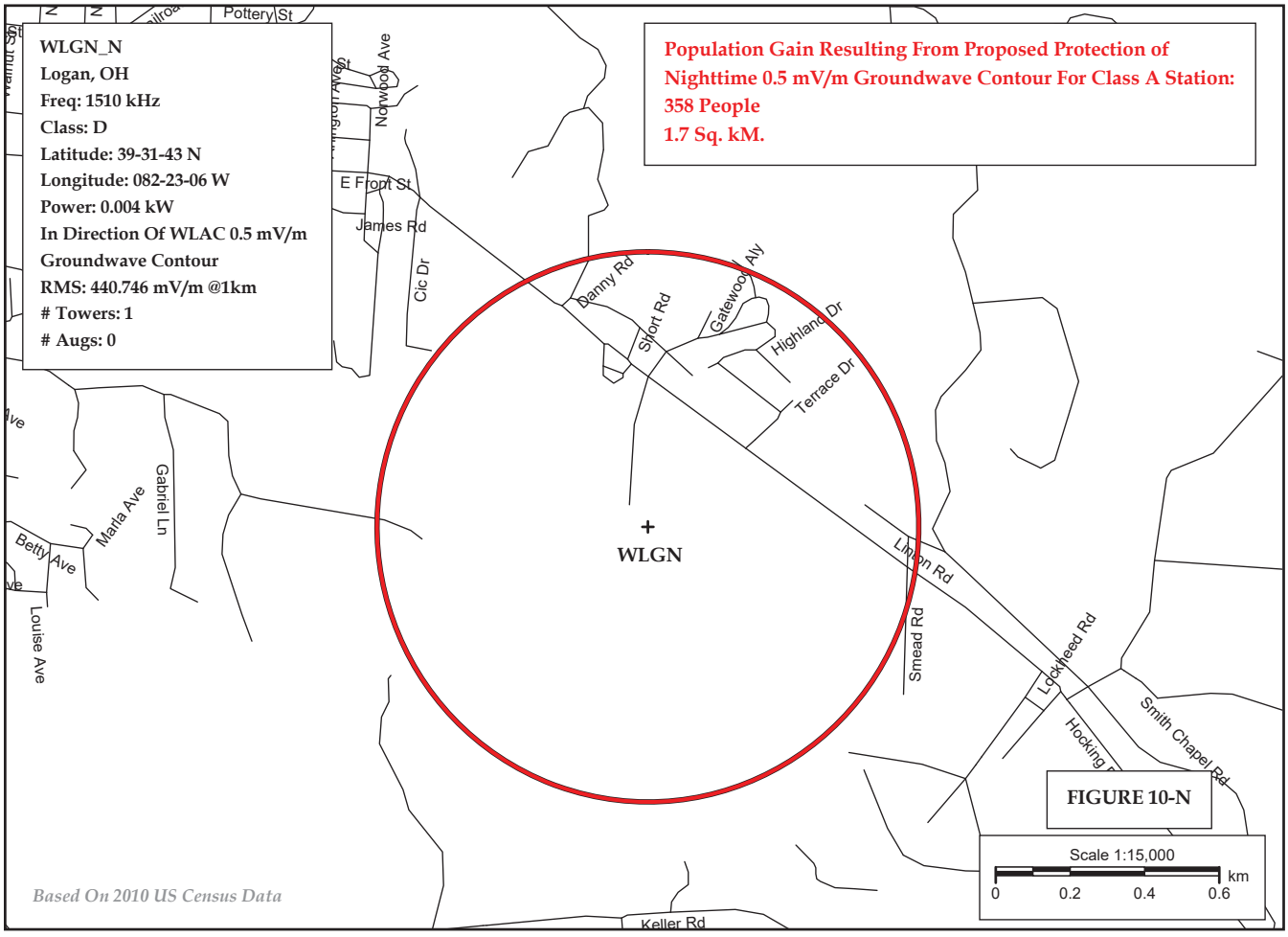
WQQW NIF 23.1 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



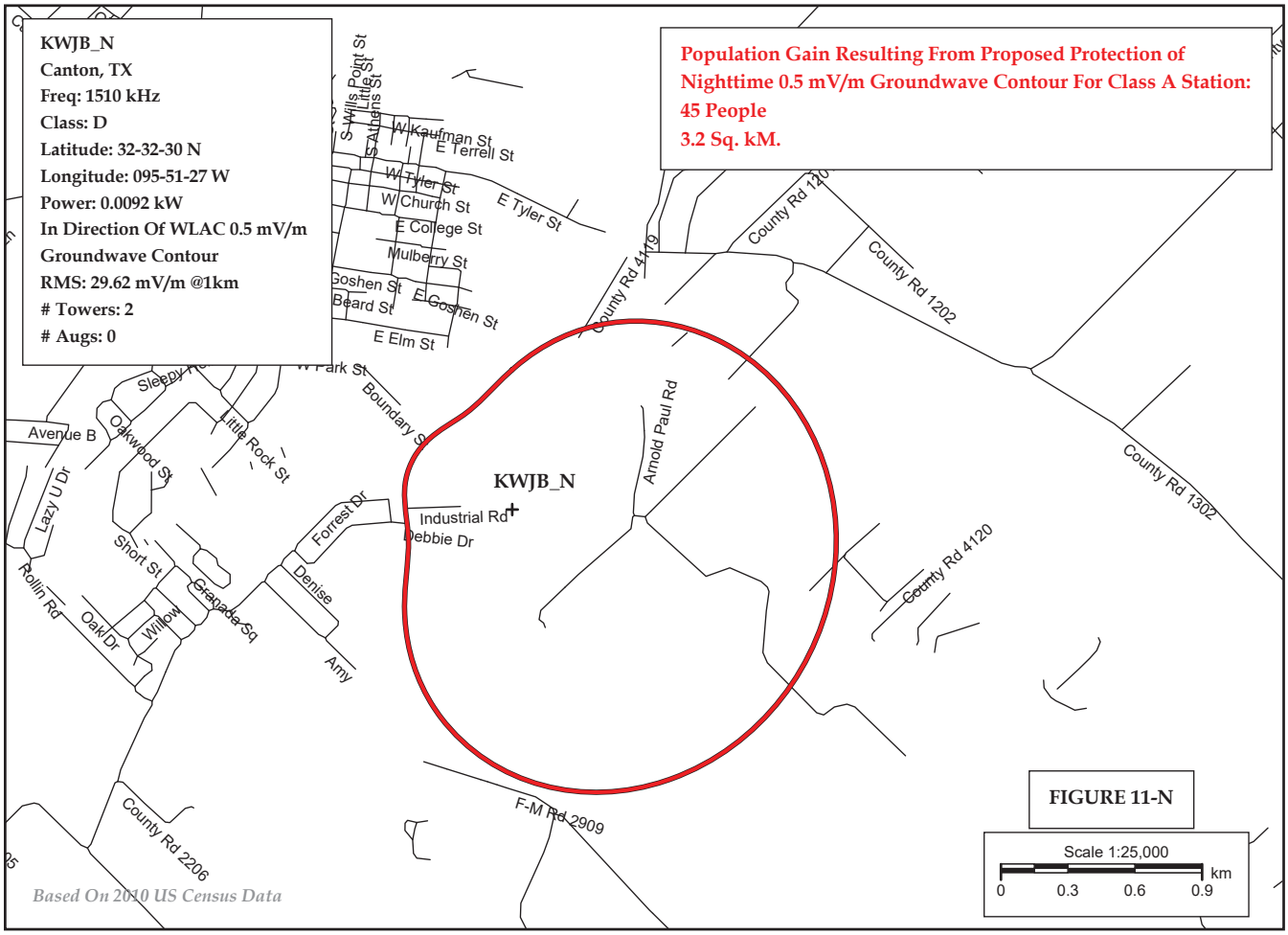
KMRF NIF 15.6 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



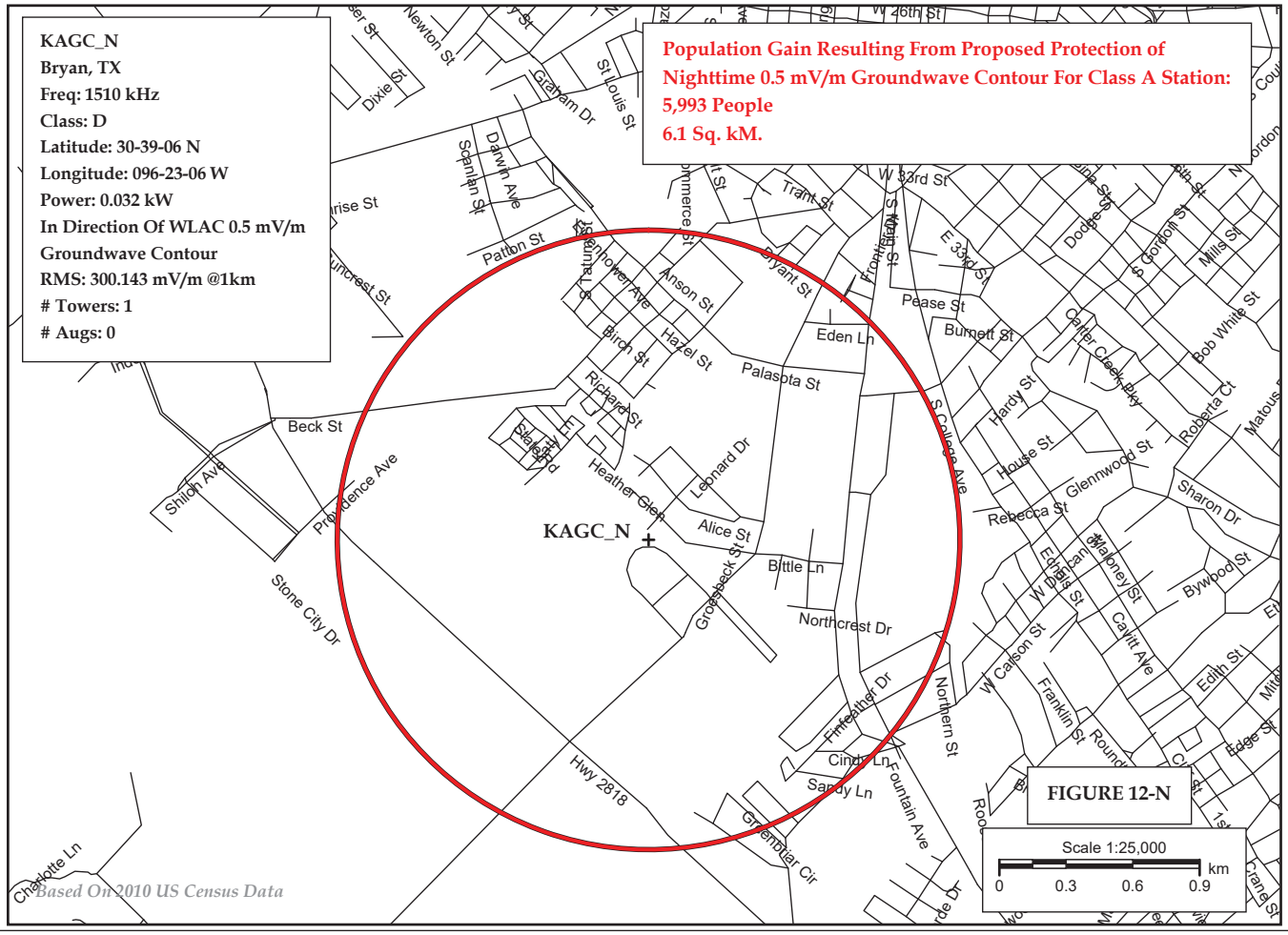
WEAL NIF 45.1 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



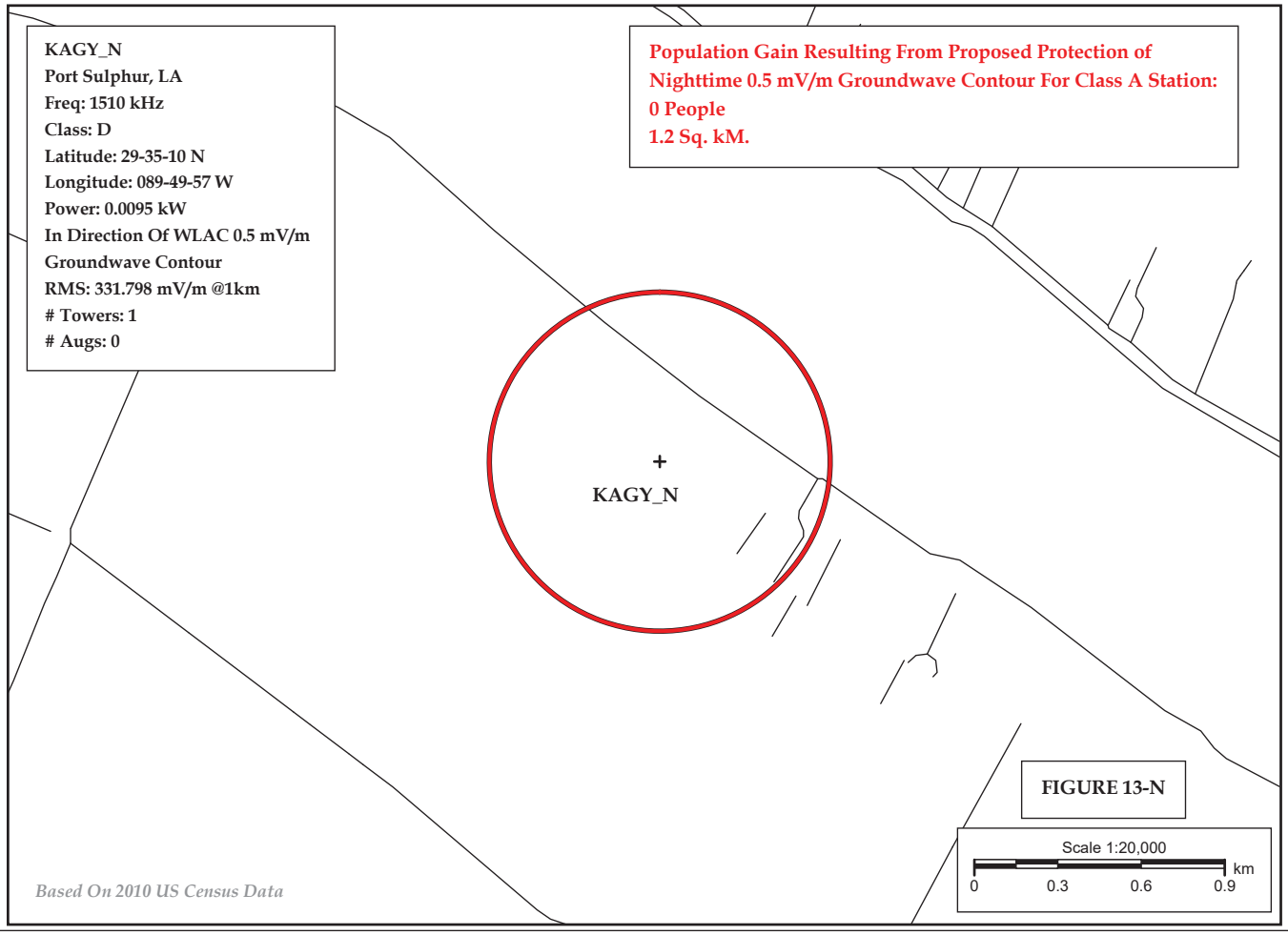
WLGN NIF 24.6 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



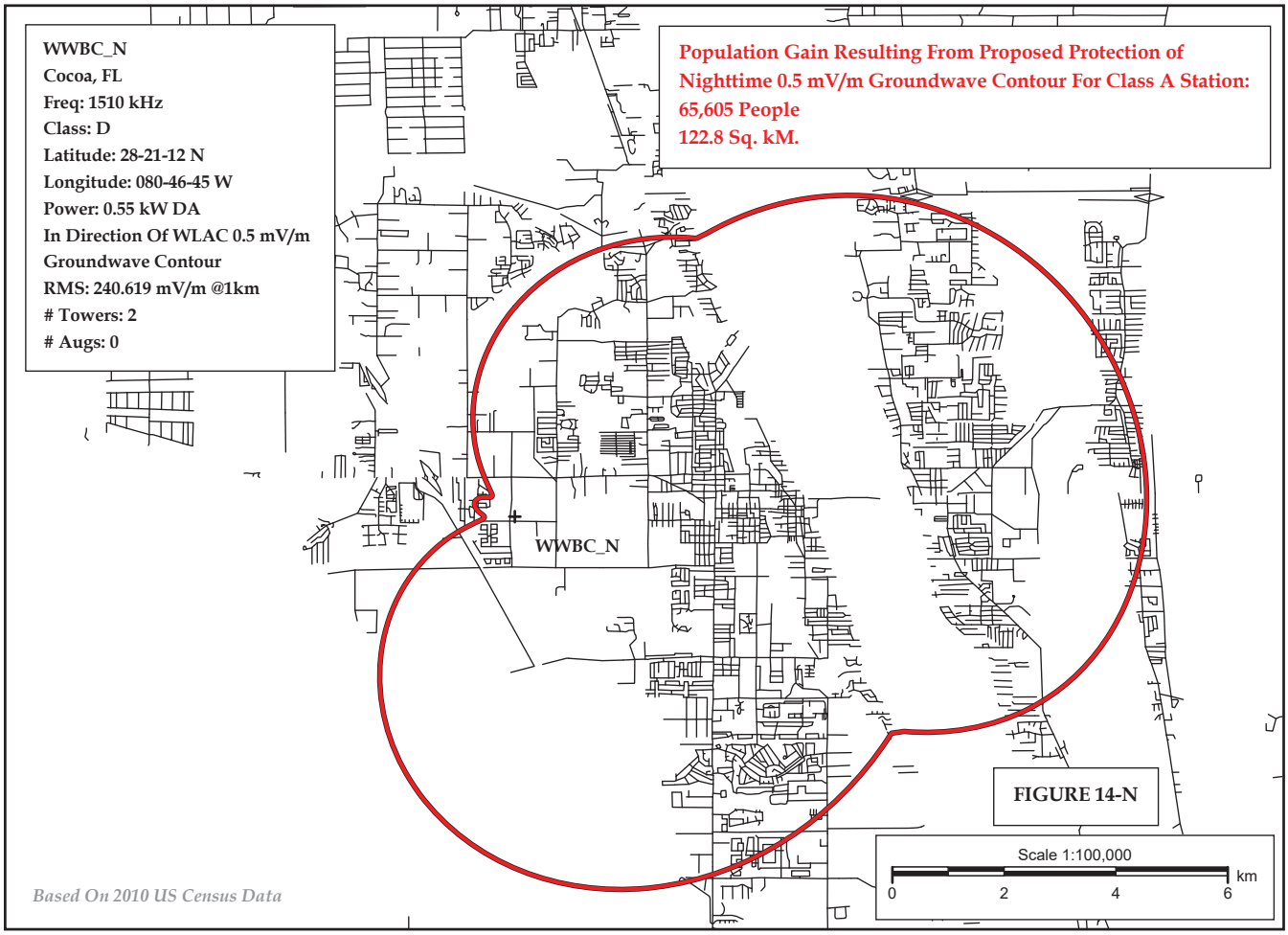
KWJB NIF 28.2 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour



KAGC NIF 27.4 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

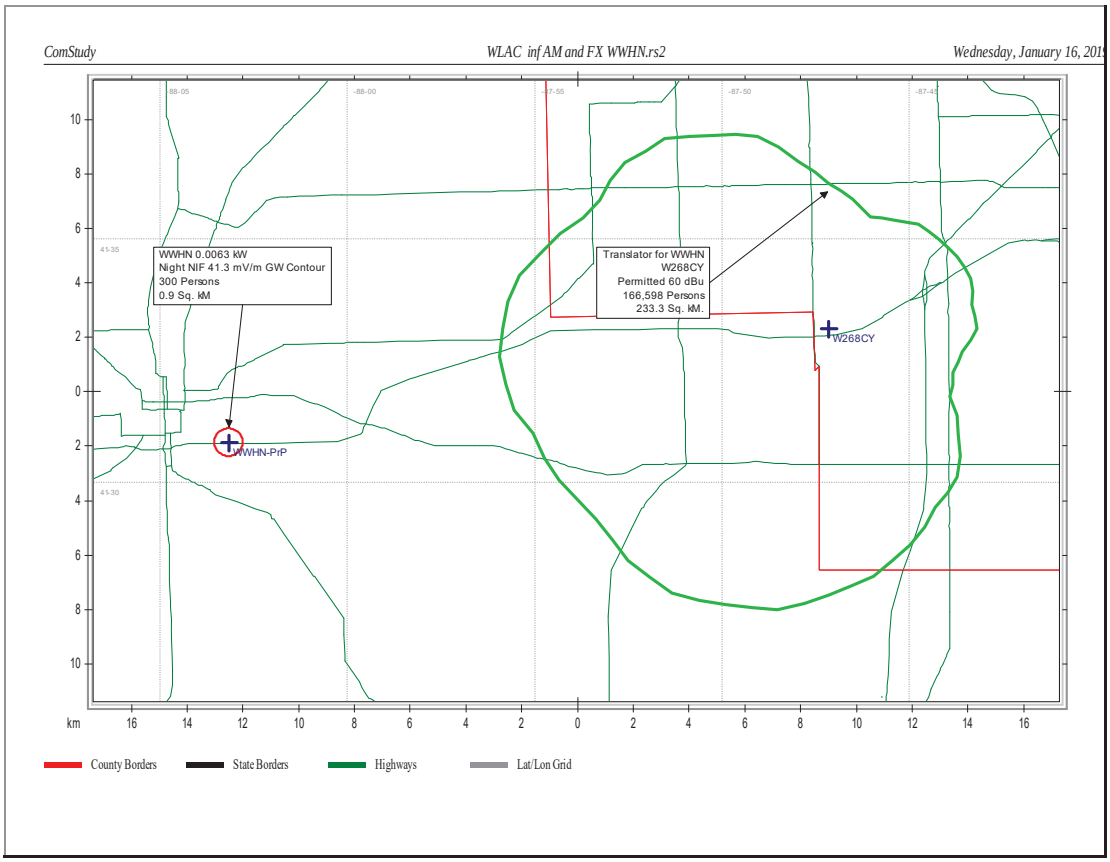


KAGY NIF 50.9 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

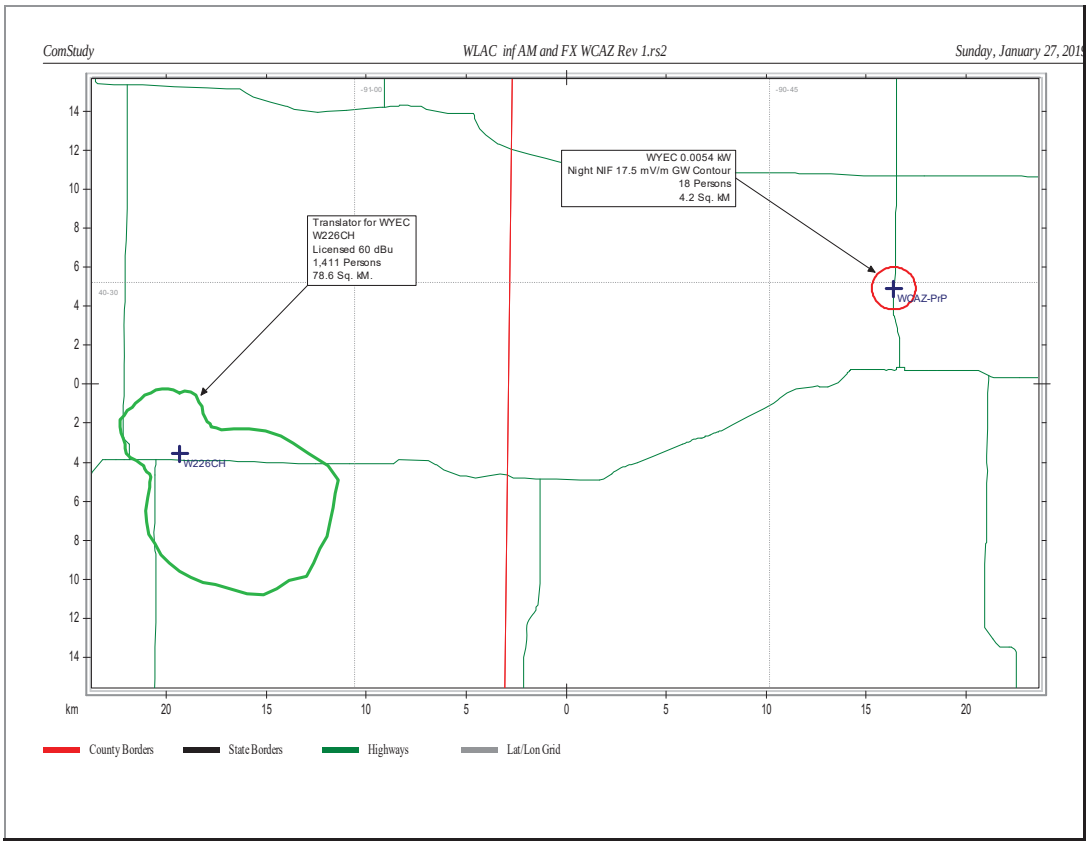


WWBC NIF 27 mV/m Groundwave Contour With Protection To Class A Station WLAC's Proposed Protected 0.5 mV/m Groundwave Nighttime Contour

WWHN


ComStudy
WLAC inf AM and FX WWHN.rs2
Wednesday, January 16, 201
WWHN 0.0063 kW
Night NIF 41.3 mV/m GW Contour
300 Persons
0.9 Sq. kM
Translator for WWHN
W268CY
Permitted 60 dBu
166,598 Persons
233.3 Sq. kM.
W268CY
WWHN-PrP
km
County Borders
State Borders
Highways
Lat/Lon Grid

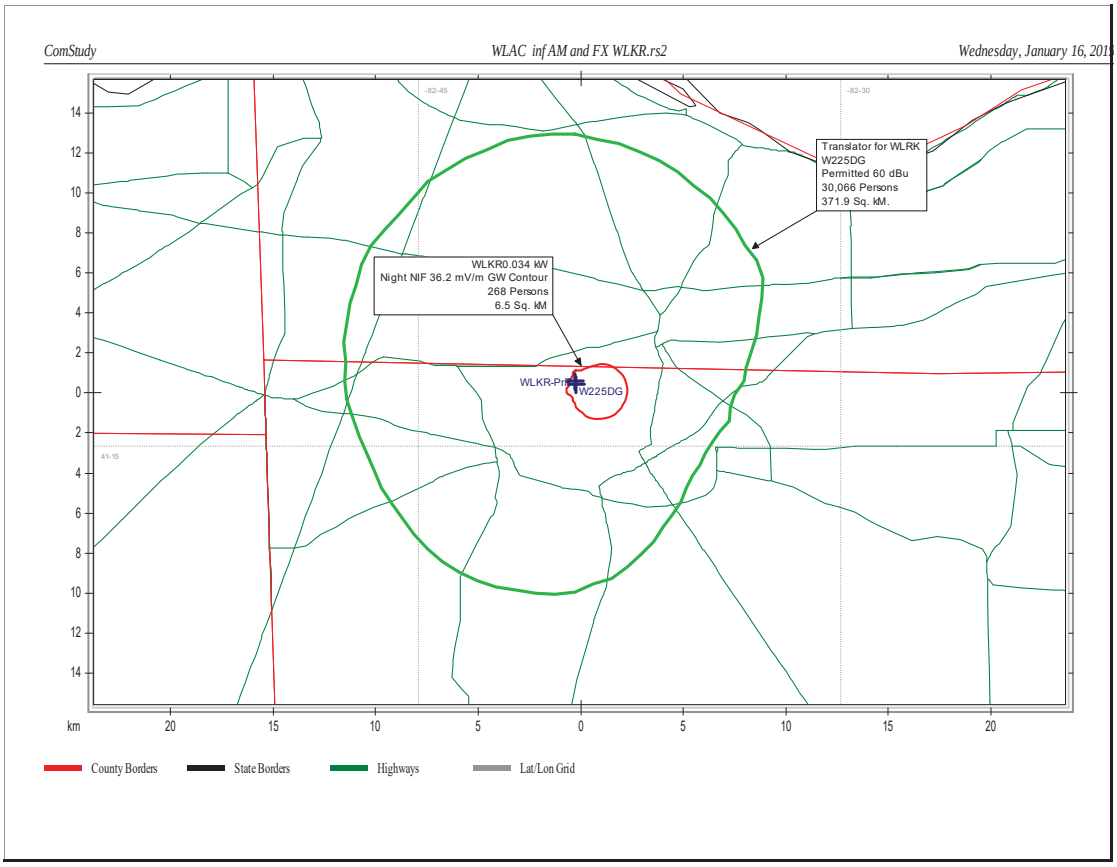
WCAZ was WYEC



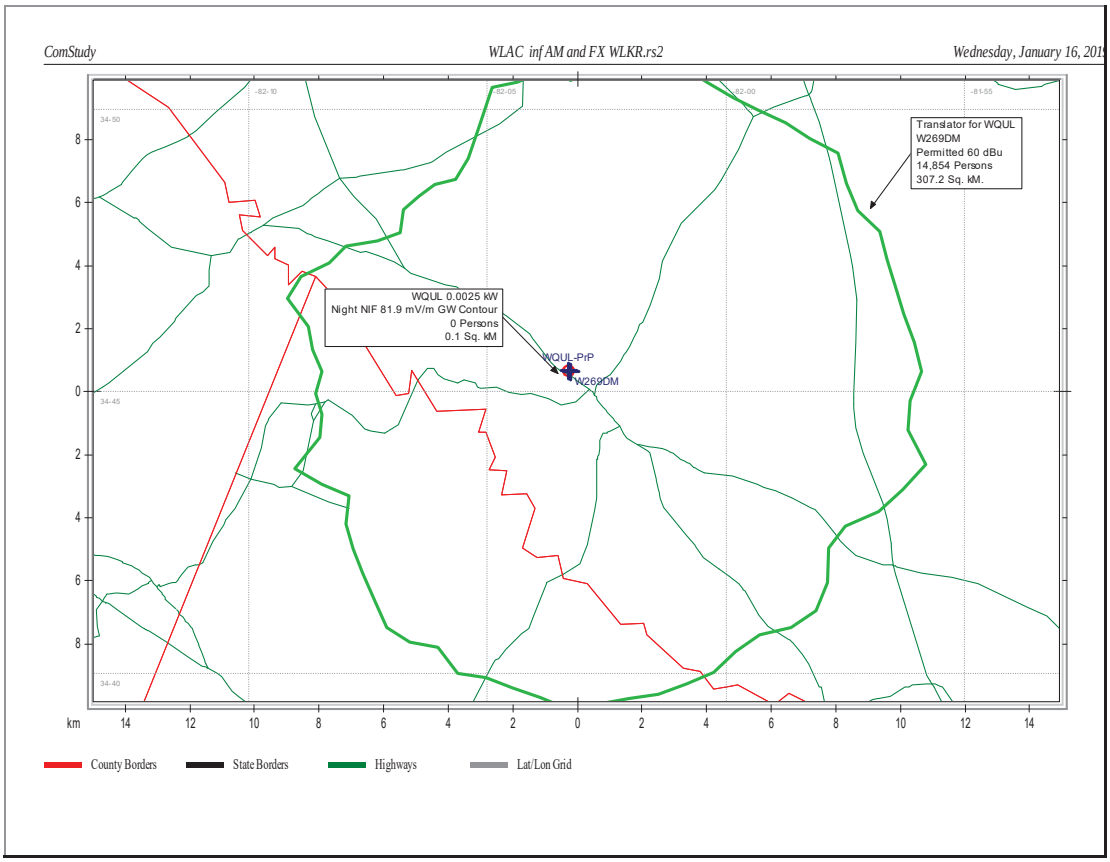
WJOT

No FM Translator

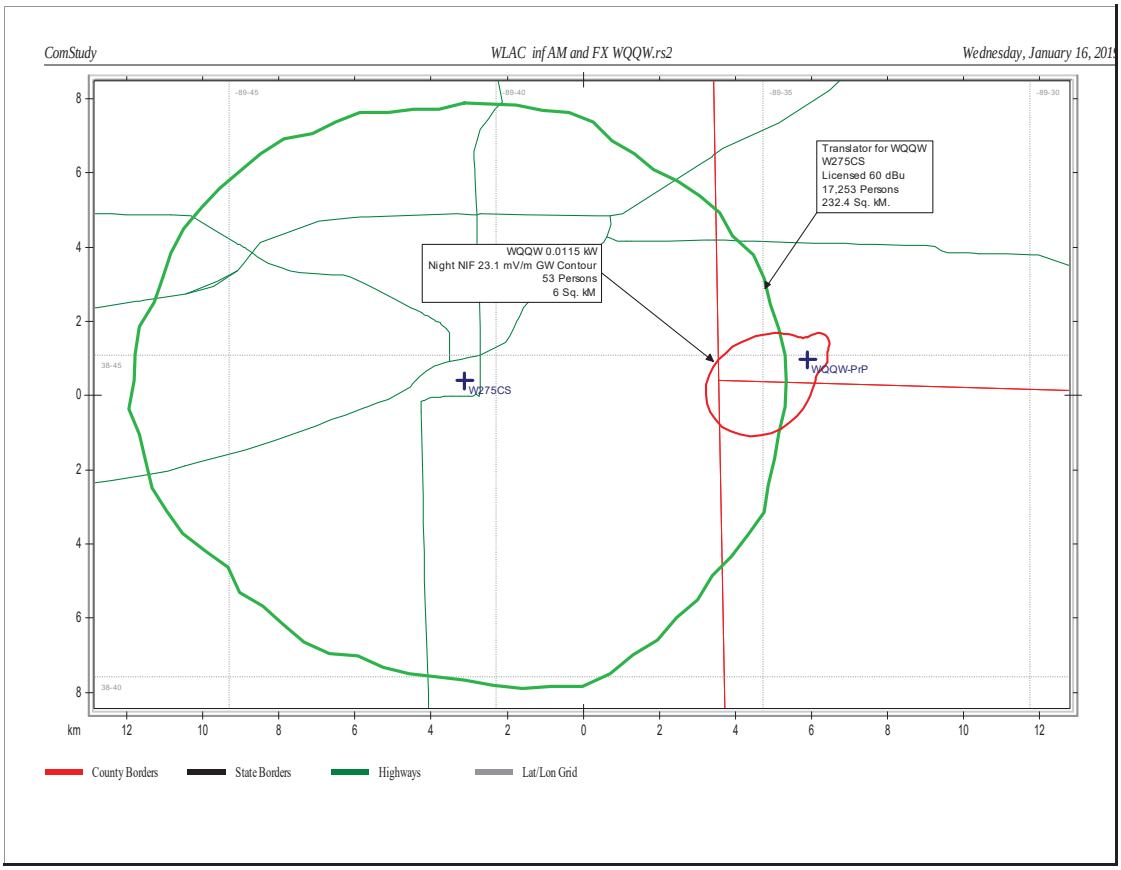
WLKR


ComStudy
WLAC inf AM and FX WLKR.rs2
Wednesday, January 16, 2013
Translator for WLRK
W225DG
Permitted 60 dBu
30,066 Persons
371.9 Sq. kM.
WLKR0.034 kW
Night NIF 36.2 mV/m GW Contour
268 Persons
6.5 Sq. kM
W225DG
km
County Borders
State Borders
Highways
Lat/Lon Grid

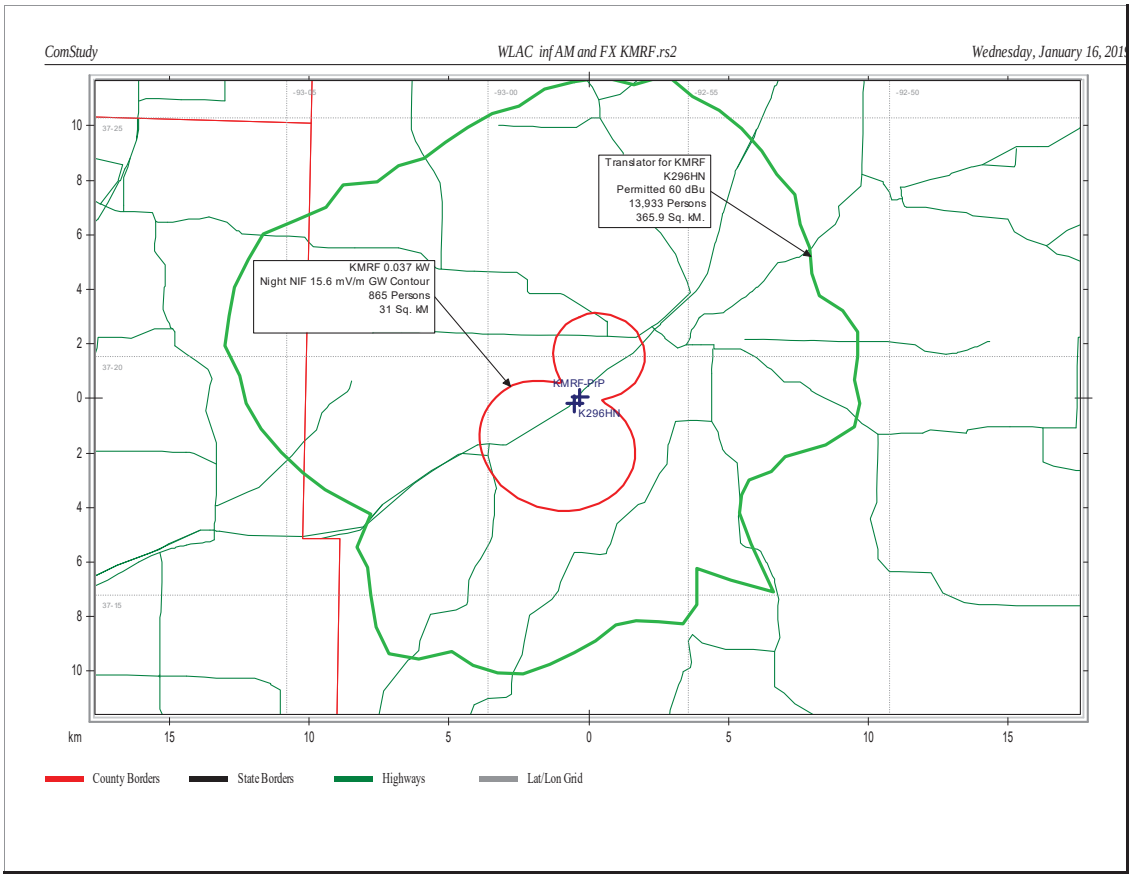
WQUL


ComStudy
WLAC inf AM and FX WLKR.rs2
Wednesday, January 16, 201
Translator for WQUL
W269DM
Permitted 60 dBu
14,854 Persons
307.2 Sq. kM.
WQUL 0.0025 kW
Night NIF 81.9 mV/m GW Contour
0 Persons
0.1 Sq. kM
WQUL-PrP
W269DM
-82-10
-82-05
-82-00
-81-55
34-50
34-45
34-40
km
14 12 10 8 6 4 2 0 2 4 6 8 10 12 14
County Borders
State Borders
Highways
Lat/Lon Grid

WQQW


ComStudy
WLAC inf AM and FX WQQW.rs2
Wednesday, January 16, 201
Translator for WQQW
W275CS
Licensed 60 dBu
17,253 Persons
232.4 Sq. kM.
WQQW 0.0115 kW
Night NIF 23.1 mV/m GW Contour
53 Persons
6 Sq. kM
W275CS
WQQW-PrP
km
County Borders
State Borders
Highways
Lat/Lon Grid

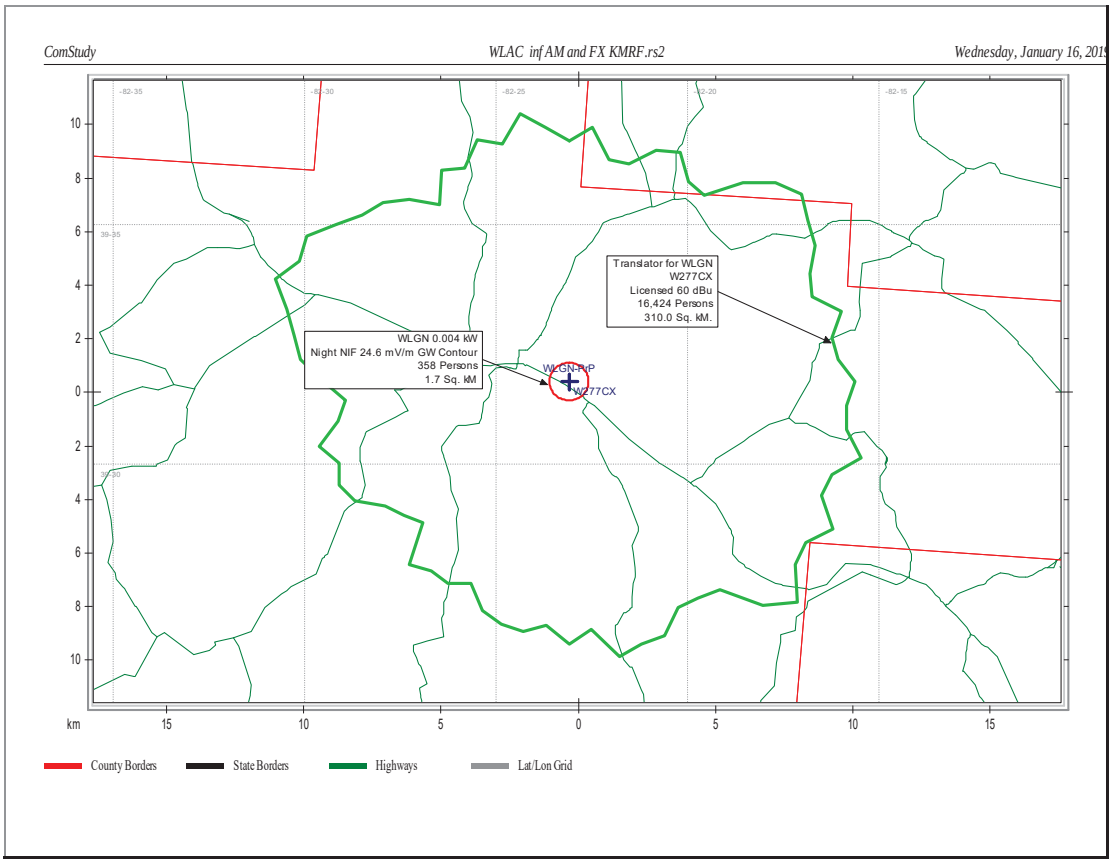
KMRF


ComStudy
WLAC inf AM and FX KMRF.rs2
Wednesday, January 16, 2019
Translator for KMRF
K296HN
Permitted 60 dBu
13,933 Persons
365.9 Sq. kM.
KMRF 0.037 kW
Night NIF 15.6 mV/m GW Contour
865 Persons
31 Sq. kM
KMRF DIP
K296HN
km
County Borders
State Borders
Highways
Lat/Lon Grid

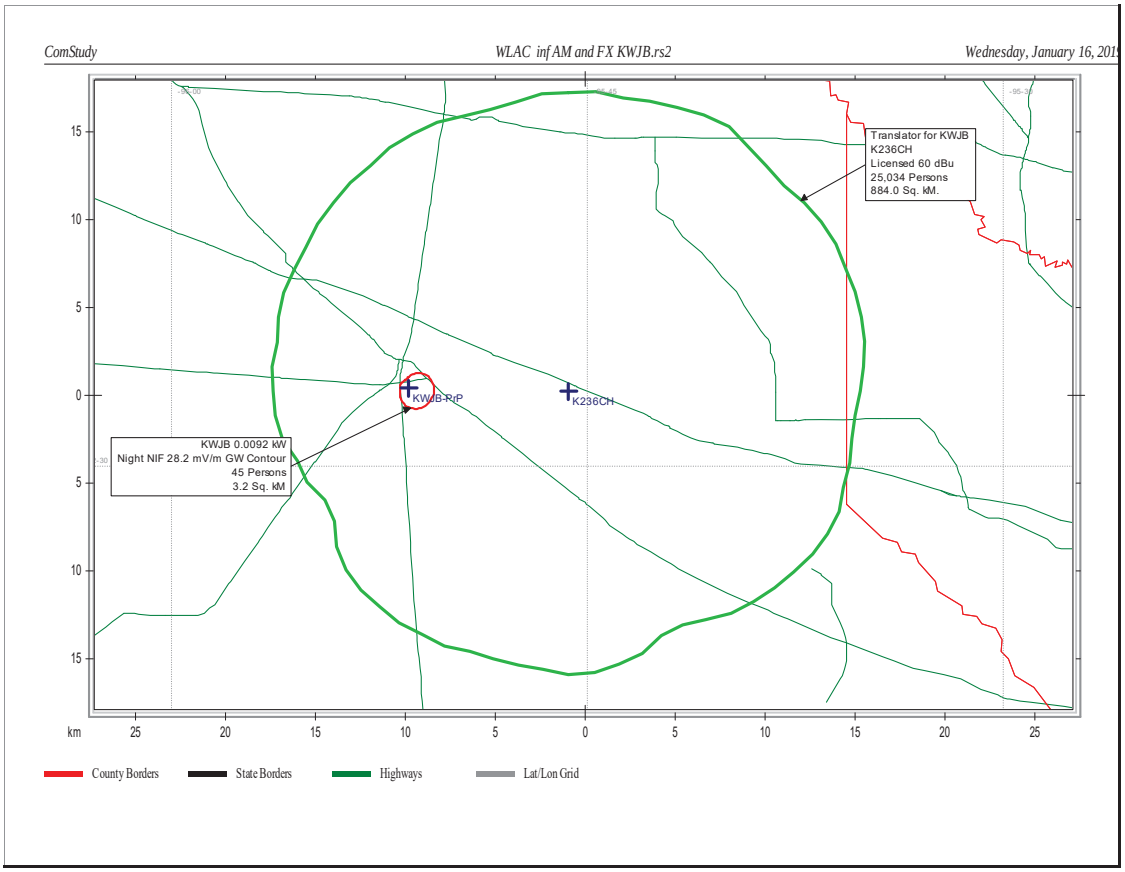
WEAL

No FM Translator

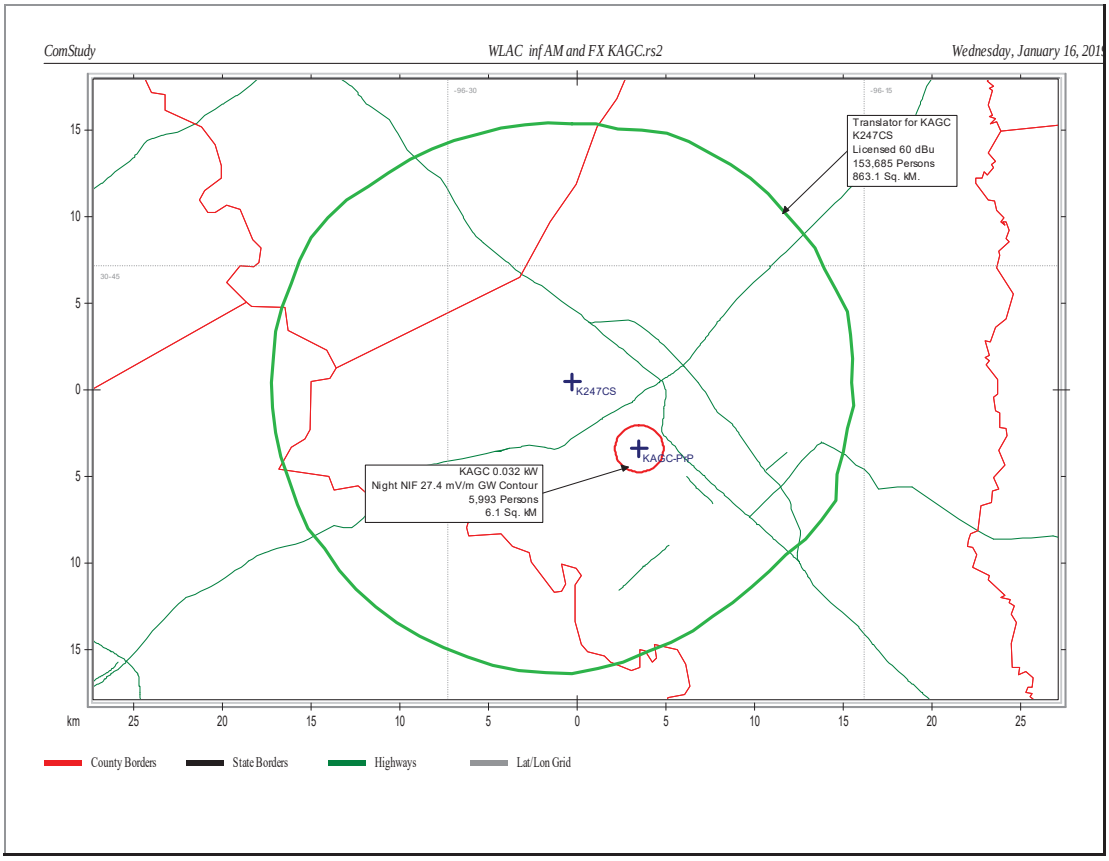
WLGN


ComStudy
WLAC inf AM and FX KMRF.rs2
Wednesday, January 16, 201
Translator for WLGN
W277CX
Licensed 60 dBu
16,424 Persons
310.0 Sq. kM.
WLGN 0.004 kW
Night NIF 24.6 mV/m GW Contour
358 Persons
1.7 Sq. kM
WLGN-FP
W277CX
km
County Borders
State Borders
Highways
Lat/Lon Grid

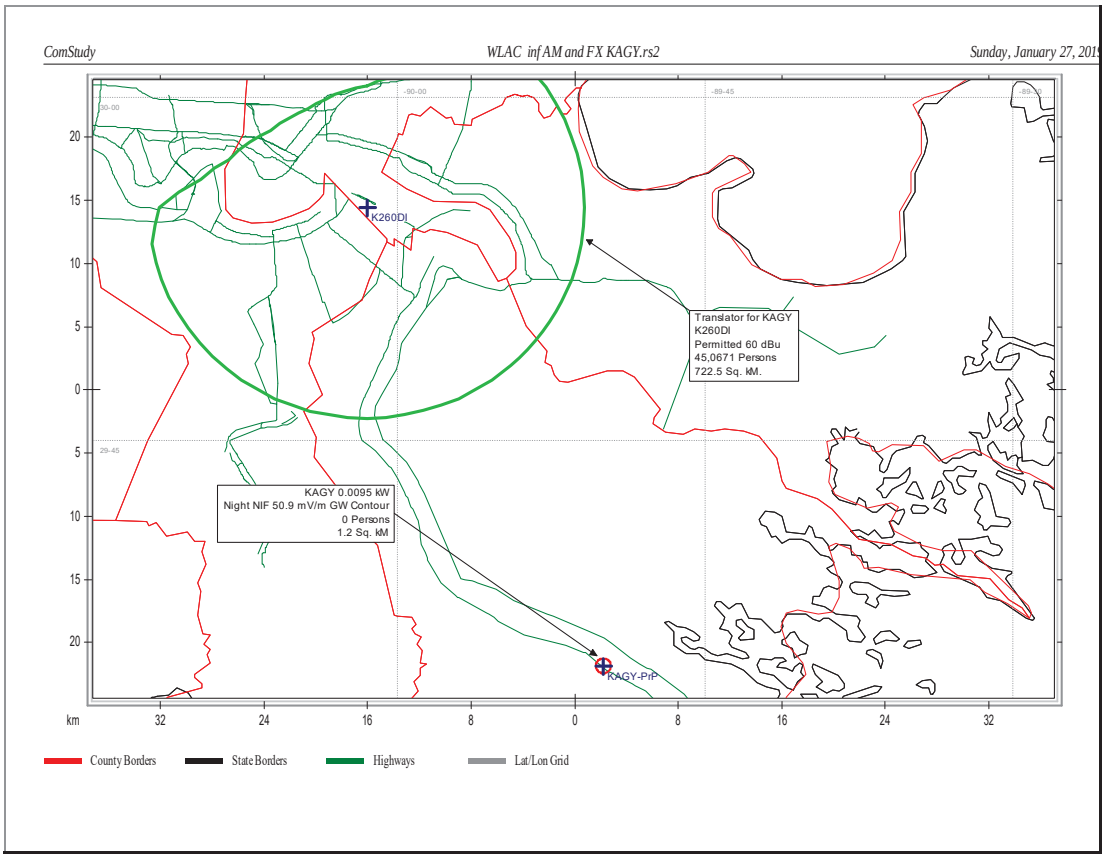
KWJB


ComStudy
WLAC inf AM and FX KWJB.rs2
Wednesday, January 16, 201
Translator for KWJB
K236CH
Licensed 60 dBu
25,034 Persons
884.0 Sq. kM.
KWJB-R/P
K236CH
KWJB 0.0092 kW
Night NIF 28.2 mV/m GW Contour
45 Persons
3.2 Sq. kM
km
County Borders
State Borders
Highways
Lat/Lon Grid

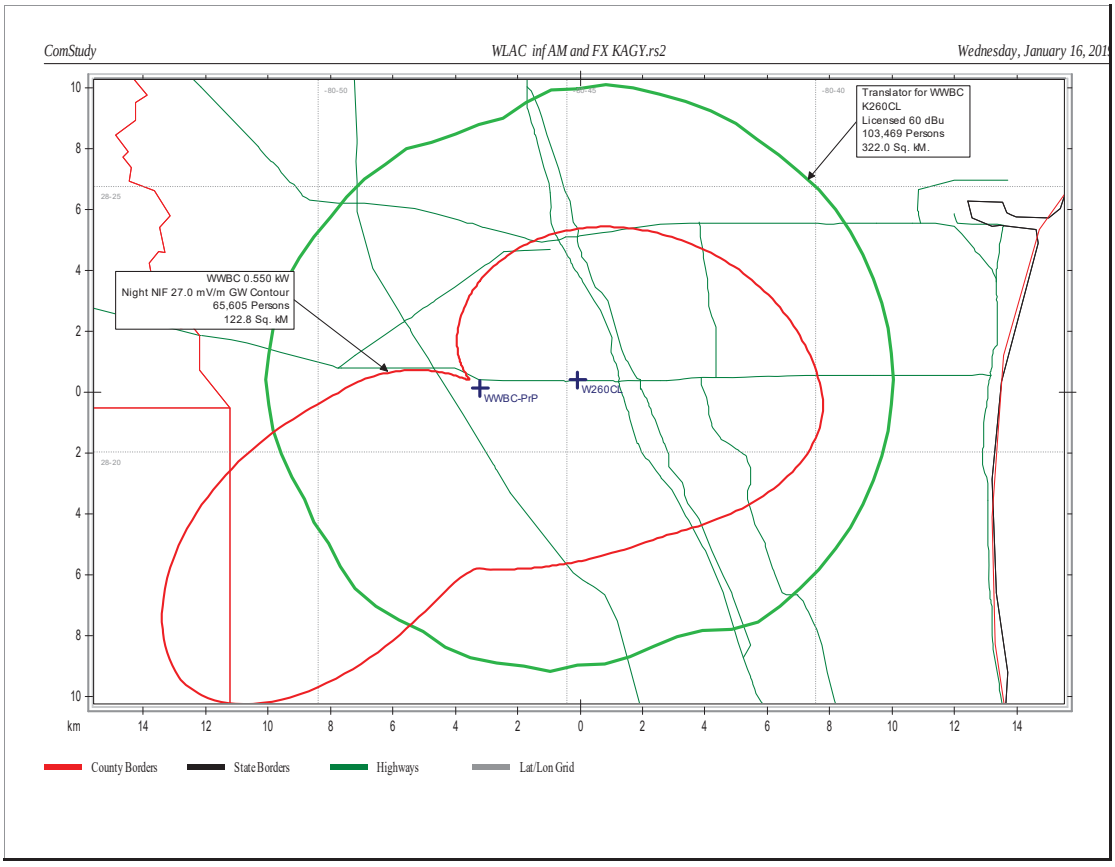
KAGC


ComStudy
WLAC inf AM and FX KAGC.rs2
Wednesday, January 16, 201
Translator for KAGC
K247CS
Licensed 60 dBu
153,685 Persons
863.1 Sq. kM.
K247CS
KAGC-PtP
KAGC 0.032 kW
Night NIF 27.4 mV/m GW Contour
5,993 Persons
6.1 Sq. kM
km
County Borders
State Borders
Highways
Lat/Lon Grid

KAGY

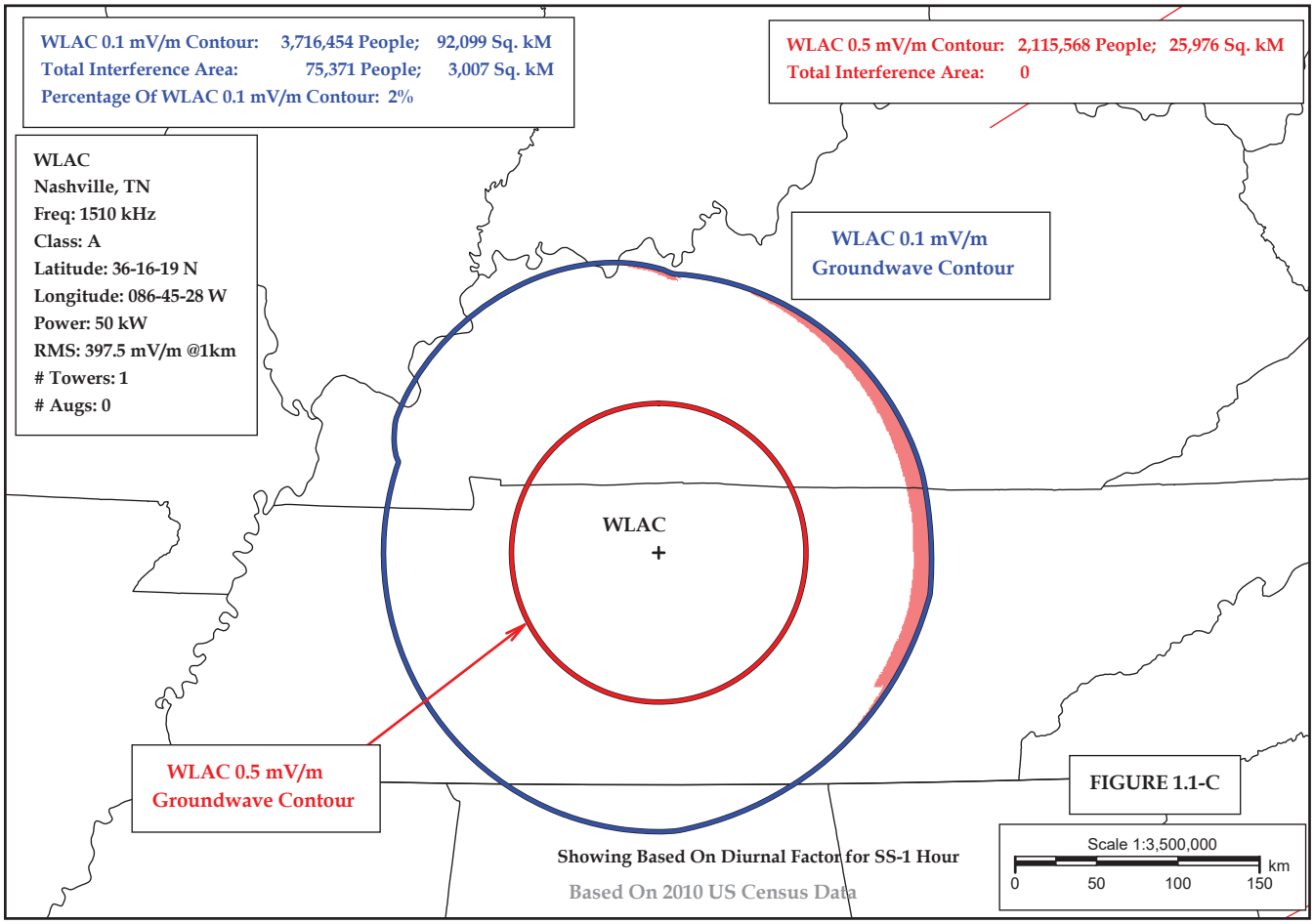

ComStudy
WLAC inf AM and FX KAGY.rs2
Sunday, January 27, 201
K260DI
Translator for KAGY
K260DI
Permitted 60 dBu
45,0671 Persons
722.5 Sq. kM.
KAGY 0.0095 kW
Night NIF 50.9 mV/m GW Contour
0 Persons
1.2 Sq. kM
KAGY-PrP
km
County Borders
State Borders
Highways
Lat/Lon Grid

WWBC

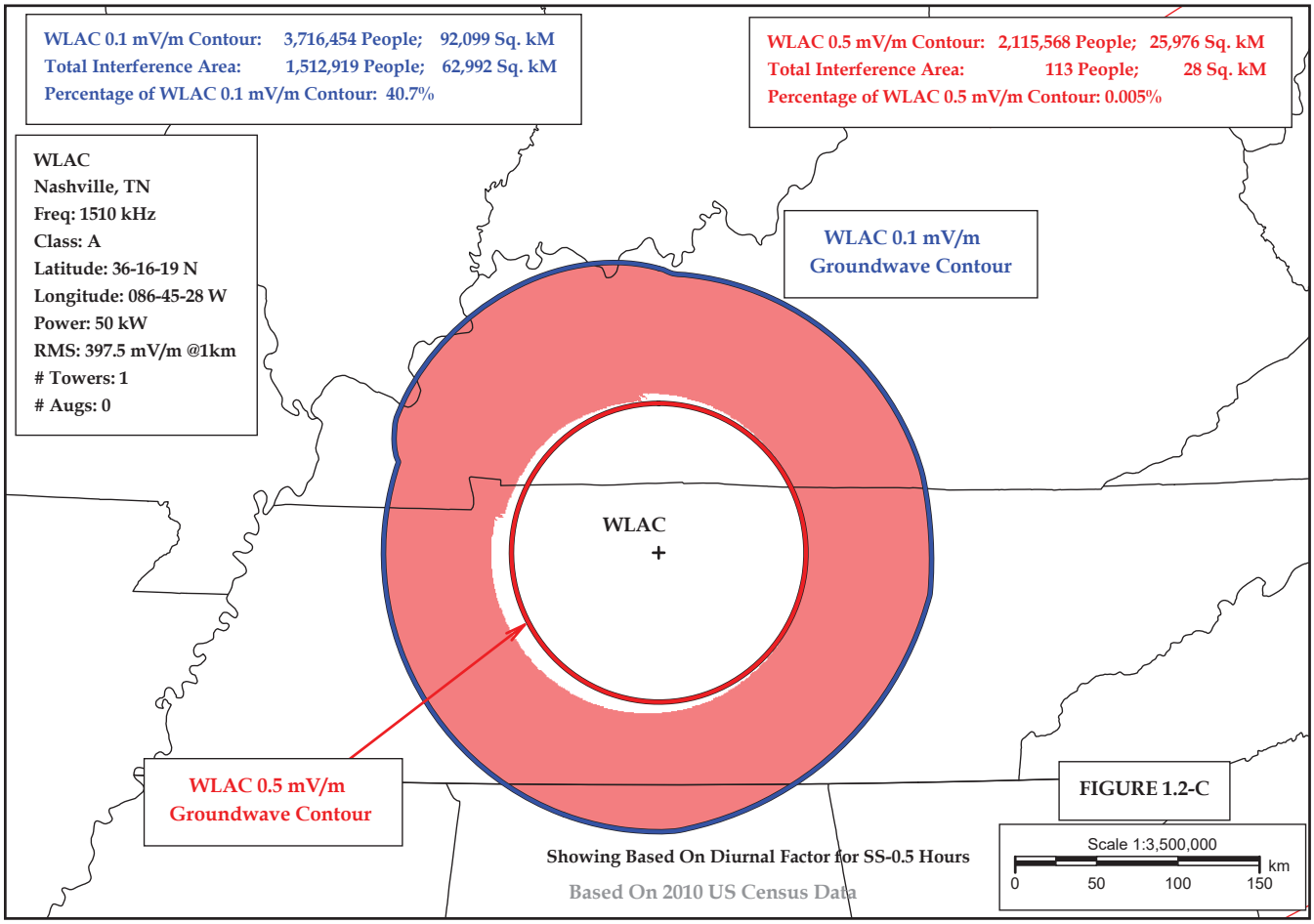

ComStudy
WLAC inf AM and FX KAGY.rs2
Wednesday, January 16, 201
Translator for WWBC
K260CL
Licensed 60 dBu
103,469 Persons
322.0 Sq. kM.
WWBC 0.550 kW
Night NIF 27.0 mV/m GW Contour
65,605 Persons
122.8 Sq. kM
WWBC-PrP
W260CL
km
County Borders
State Borders
Highways
Lat/Lon Grid

Summary of FM Translator Studies/WLAC

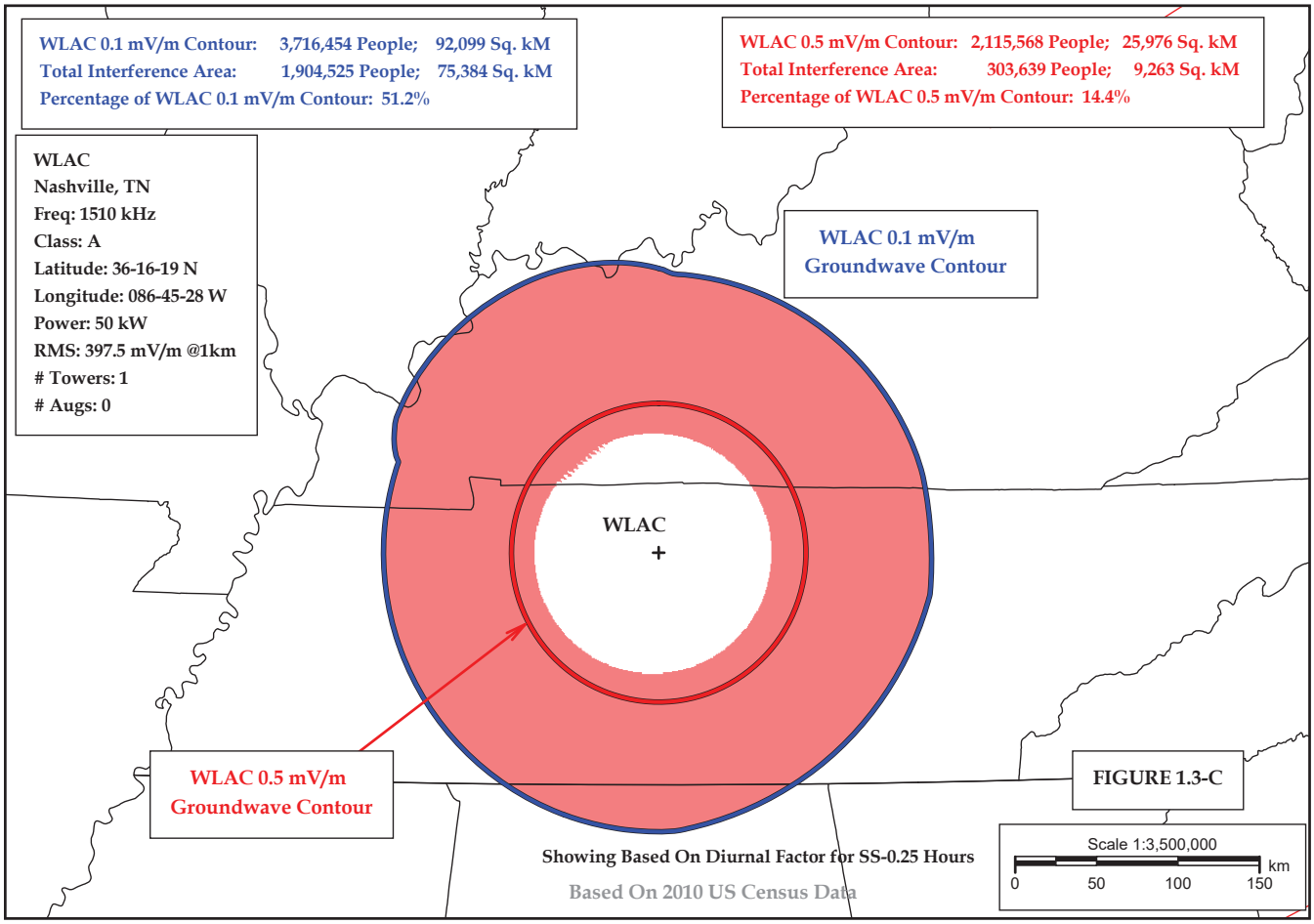
Class D AM Station Causing Interference to Class A Station WLAC if Class D Operates with Maximum Power Per Nighttime Alternative 1	FM Translator (License or Permit) Associated with Class D Station	Population Within FM Translator's 60 dBu Contour	Population Within Class D Station's Potential Nighttime Interference Free Contour Under Nighttime Alternative 1
WWHN	W268CY	166,598	300
WCAZ (formerly WYEC)	W226CH	1,411	18
WJOT	N/A	N/A	59
WLKR	W225DG	30,066	268
WQUL	W269DM	14,854	0
WQQW	W275CS	17,253	53
KMRF	K296HN	13,933	865
WEAL	N/A	N/A	1,181
WLGN	W277CX	16,424	358
KWJB	K236CH	25,034	45
KAGC	K247CS	153,685	5,993
KAGY	K260DI	450,671	0
WWBC	W260CL	103,469	65,605
Cumulative Sum:		**993,398**	**74,745**



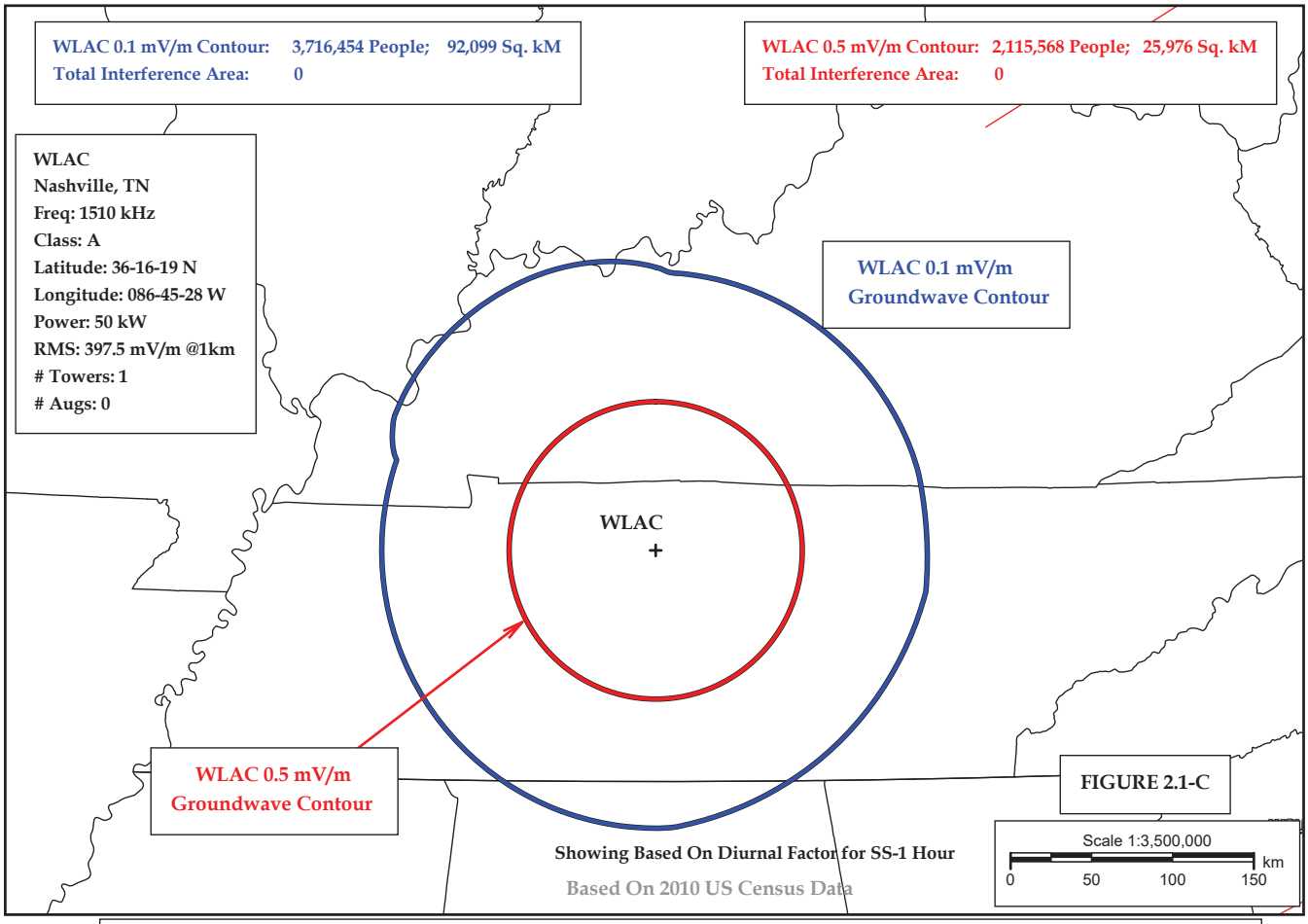
Alternative 1 - Proposed Critical Hours Interference to WLAC From The Licensed Daytime Hours Operation Of Stations KWJB, WQUL, KIFG, WWBC, WLGN, WPGR, and KAGY To Class A Station WLAC, Nashville, TN for One Hour Before Sunset



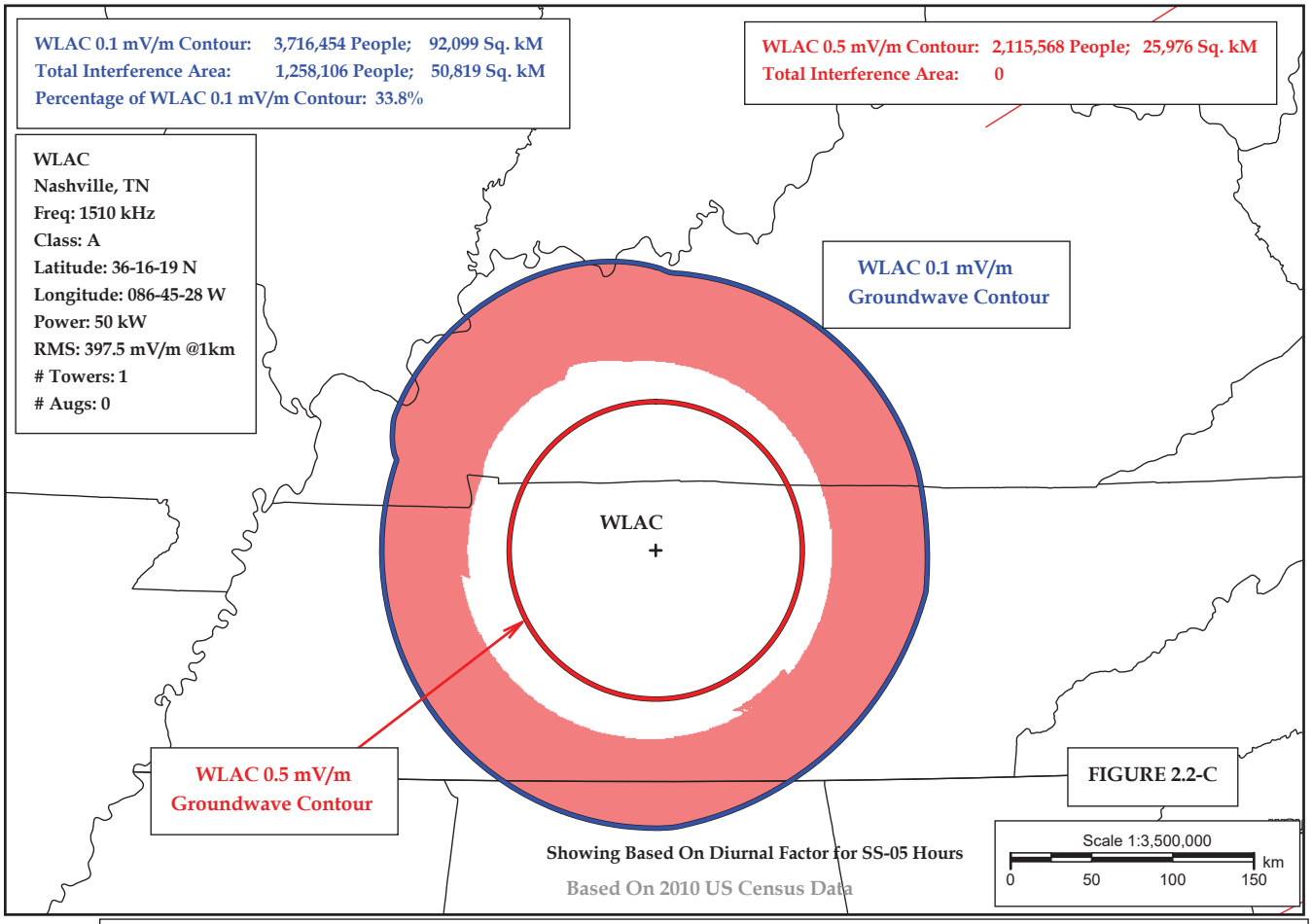
Alternative 1 - Proposed Critical Hours Interference to WLAC From The Licensed Daytime Hours Operation Of Stations KWJB, WQUL, KIFG, WWBC, WLGN, WPGR, and KAGY To Class A Station WLAC, Nashville, TN for One-Half Hour Before Sunset



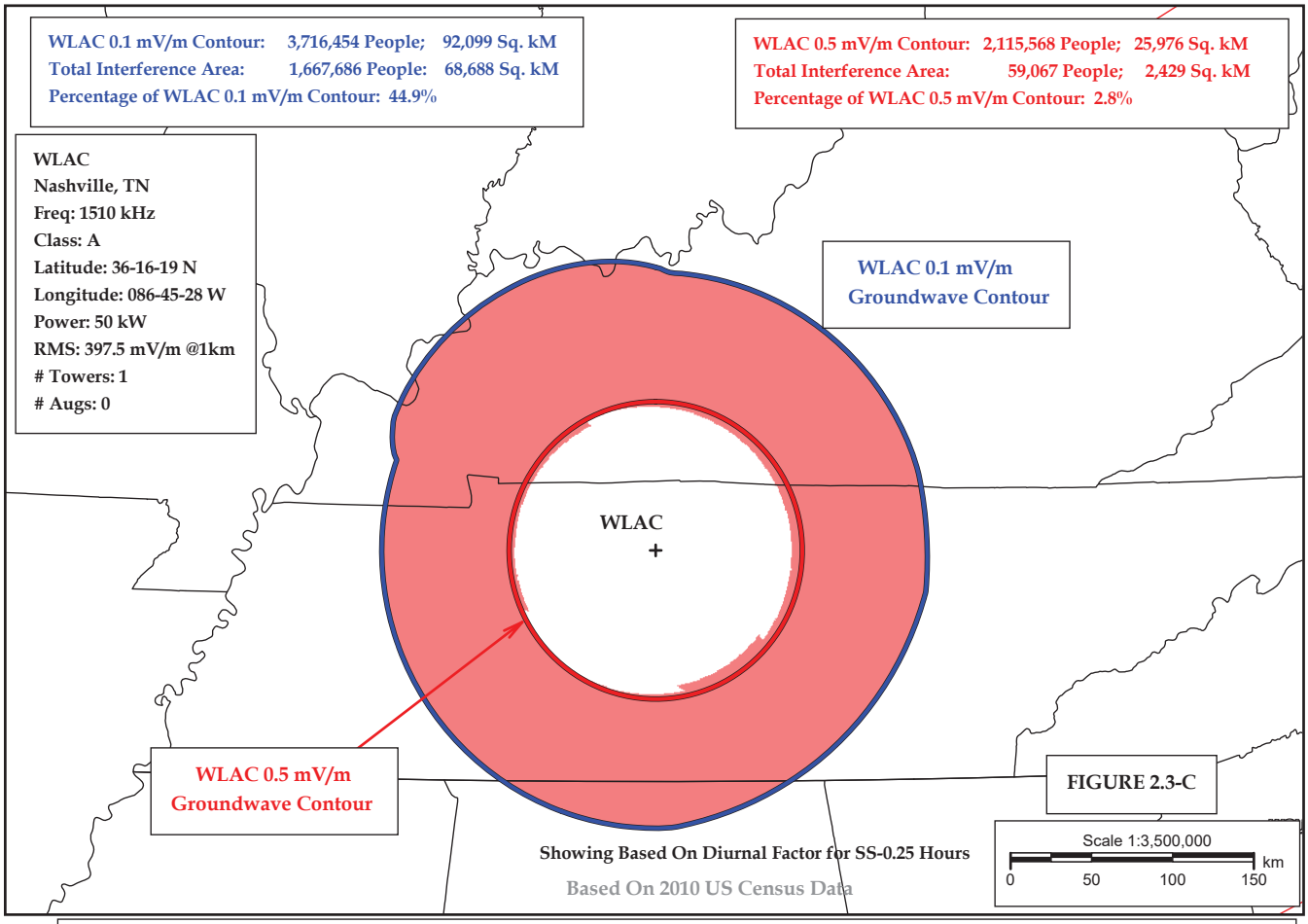
Alternative 1 - Proposed Critical Hours Interference to WLAC From The Licensed Daytime Hours Operation Of Stations KWJB, WQUL, KIFG, WWBC, WLGN, WPGR, and KAGY To Class A Station WLAC, Nashville, TN for One-Quarter Hour Before Sunset



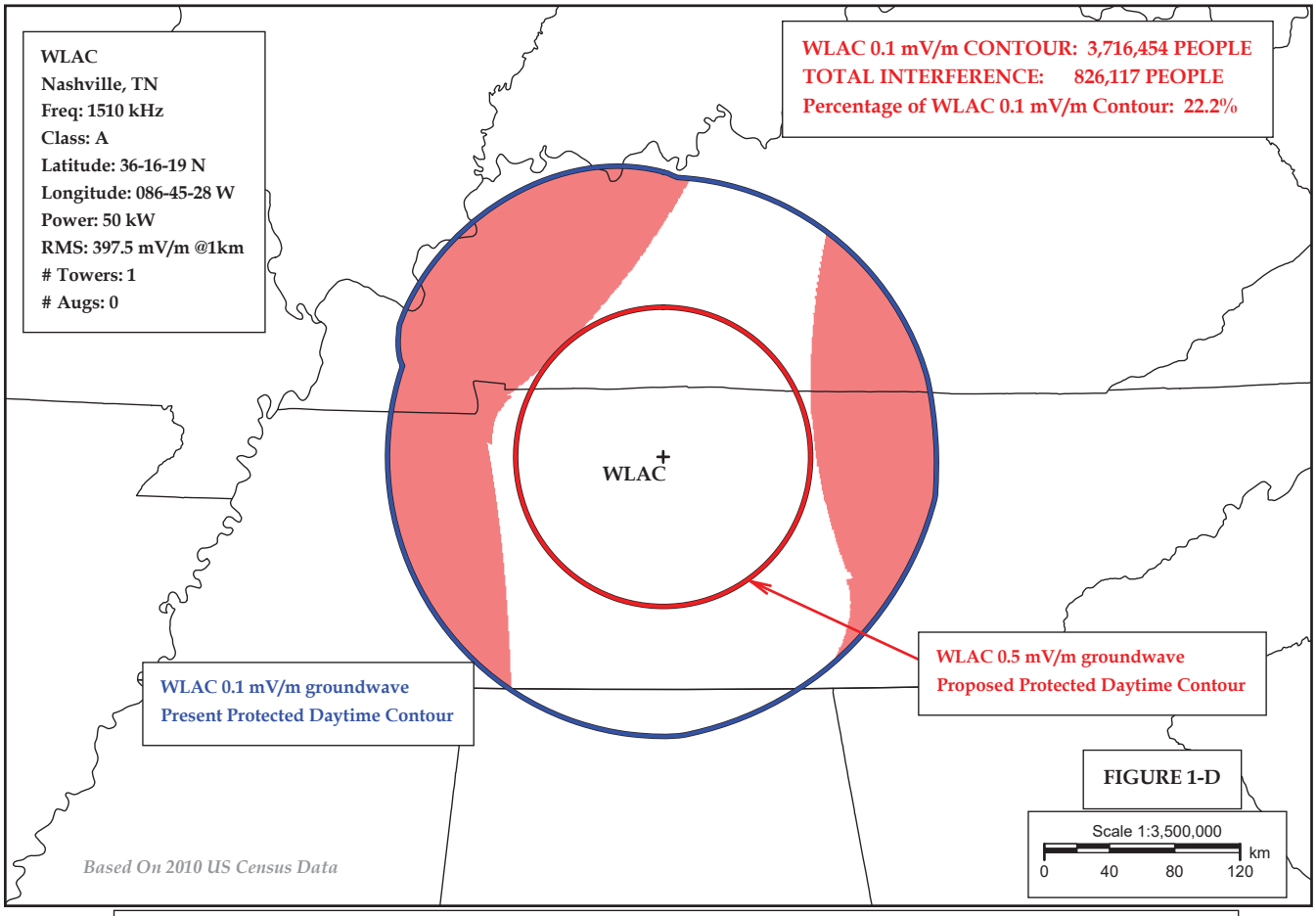
Alternative 2 - Proposed Critical Hours Interference to WLAC From Potential Critical Hours Operation Of Stations KWJB, WQUL, KIFG, WWBC, WLGN, WPGR, and KAGY To Class A Station WLAC, Nashville, TN for One Hour Before Sunset



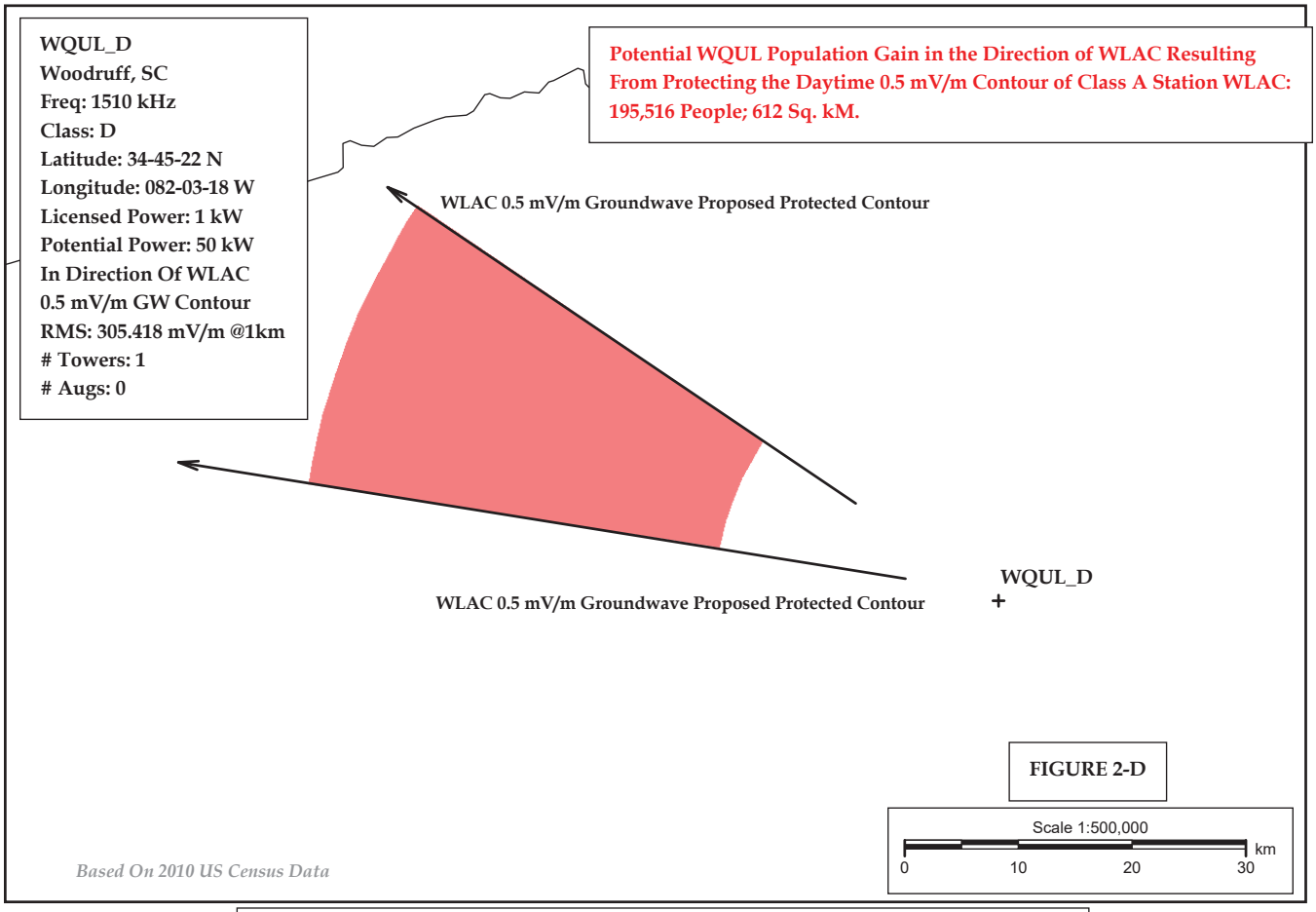
Alternative 2 - Proposed Critical Hours Interference to WLAC From Potential Critical Hours Operation Of Stations KWJB, WQUL, KIFG, WWBC, WLGN, WPGR, and KAGY To Class A Station WLAC, Nashville, TN for One-Half Hour Before Sunset



Alternative 2 - Proposed Critical Hours Interference to WLAC From Potential Critical Hours Operation Of Stations KWJB, WQUL, KIFG, WWBC, WLGN, WPGR, and KAGY To Class A Station WLAC, Nashville, TN for One-Quarter Hour Before Sunset



Red Shaded Area is Predicted Daytime Interference within WLAC's 0.1 mV/m Contour From Nearby Class D Stations WQUL, KMRF, WMJL, WPOT, WNWS and WDEB Operating With Maximum Power in Direction of WLAC



Potential WQUL 0.5 mV/m Gain Area In the Direction of WLAC Resulting From Class A Station WLAC Being Protected to its 0.5 mV/m Groundwave Daytime Contour

KMRF_D
Marshfield, MO
Freq: 1510 kHz
Class: D
Latitude: 37-19-09 N
Longitude: 092-57-43 W
Licensed Power: 5 kW
Potential Power: 50 kW
In Direction Of WLAC
0.5 mV/m GW Contour
RMS: 315.539 mV/m @1km
Towers: 1
Augs: 0

Potential KMRF Population Gain in the Direction of WLAC Resulting From Protecting the Daytime 0.5 mV/m Contour of Class A Station WLAC: 18,823 People; 1,844 Sq. kM.

KMRF

+

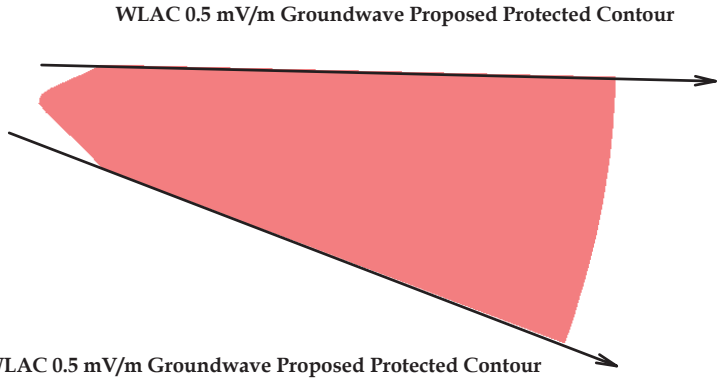
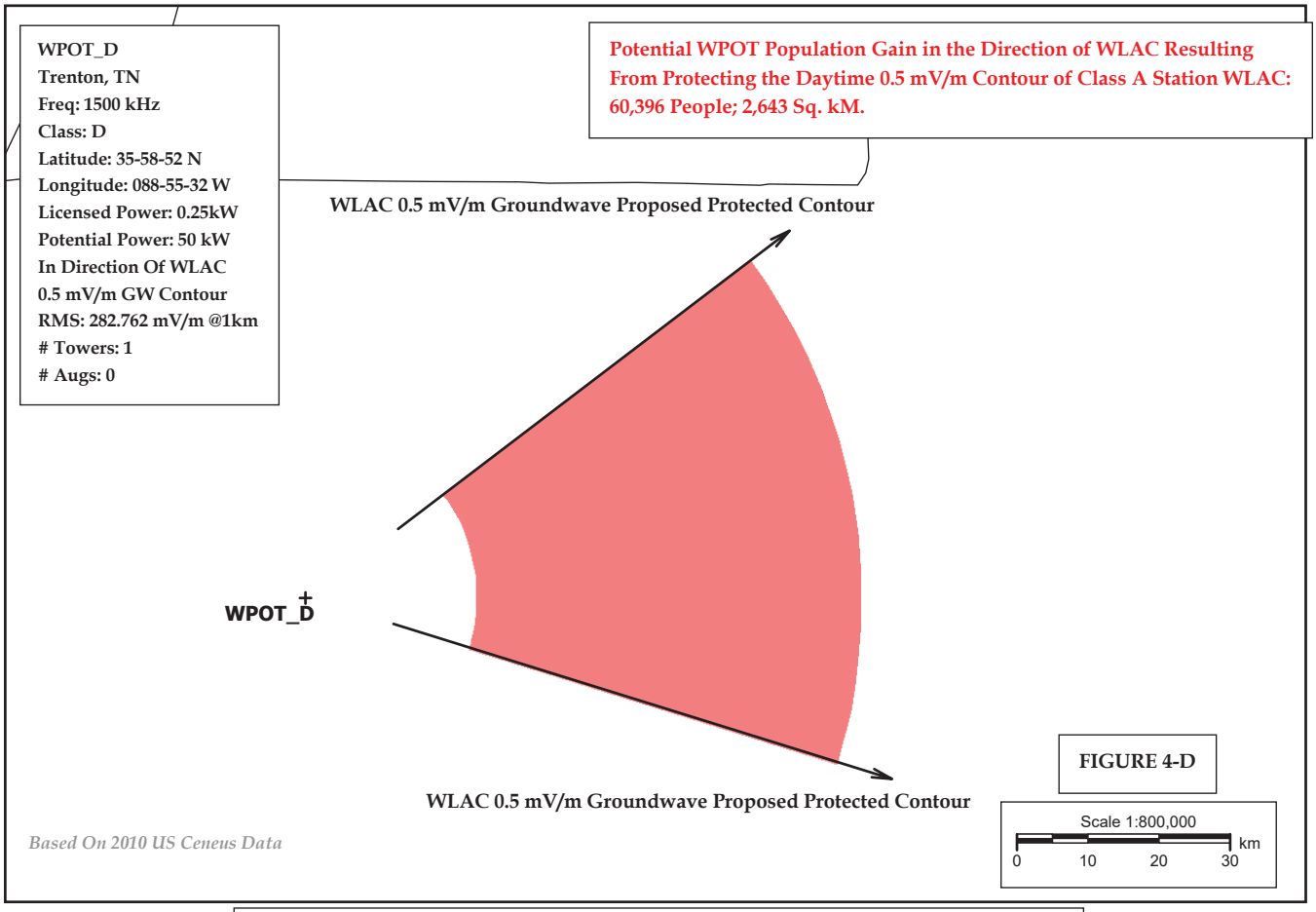


FIGURE 3-D

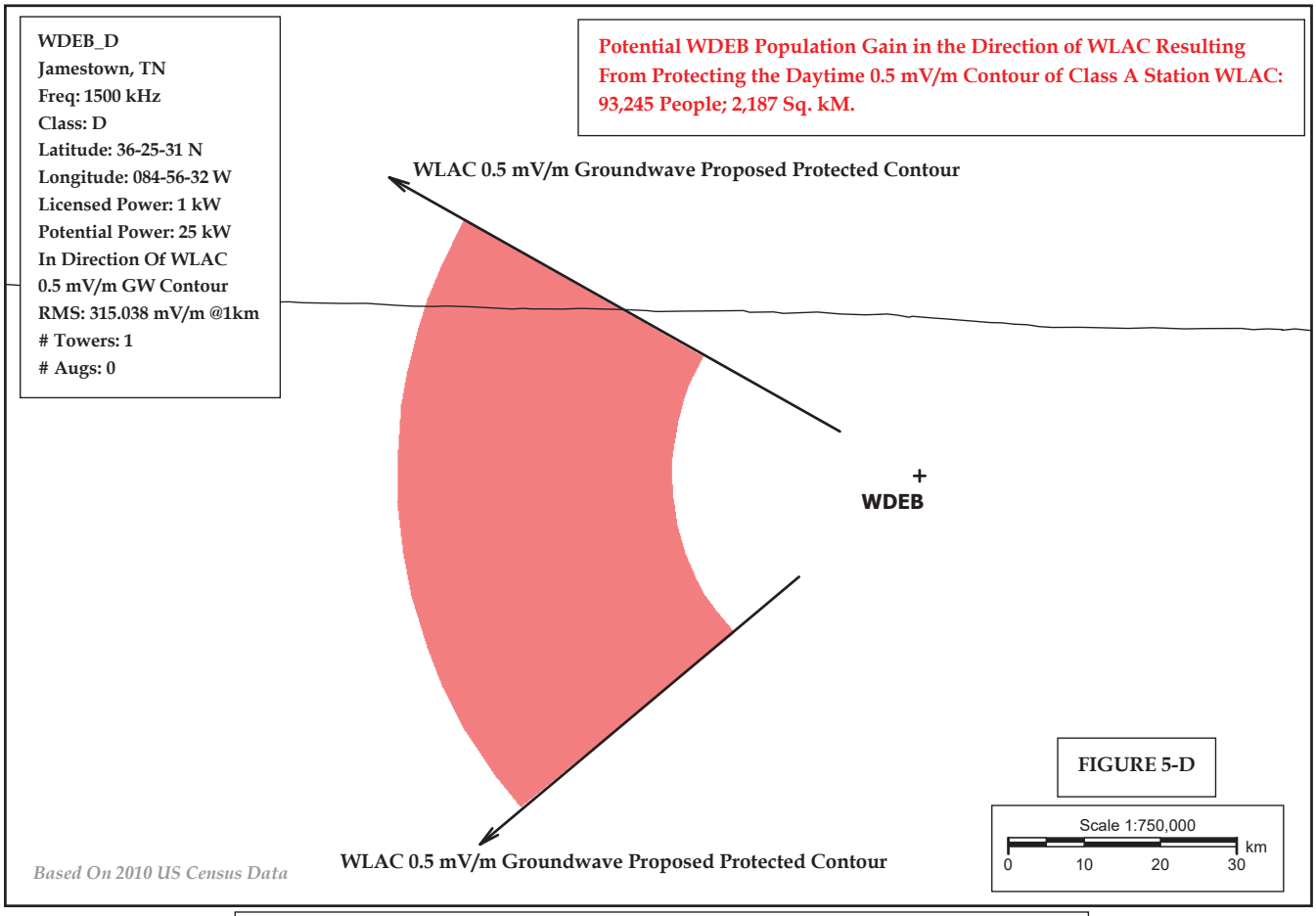
Scale 1:800,000
0 10 20 30 km

Based On 2010 US Census Data

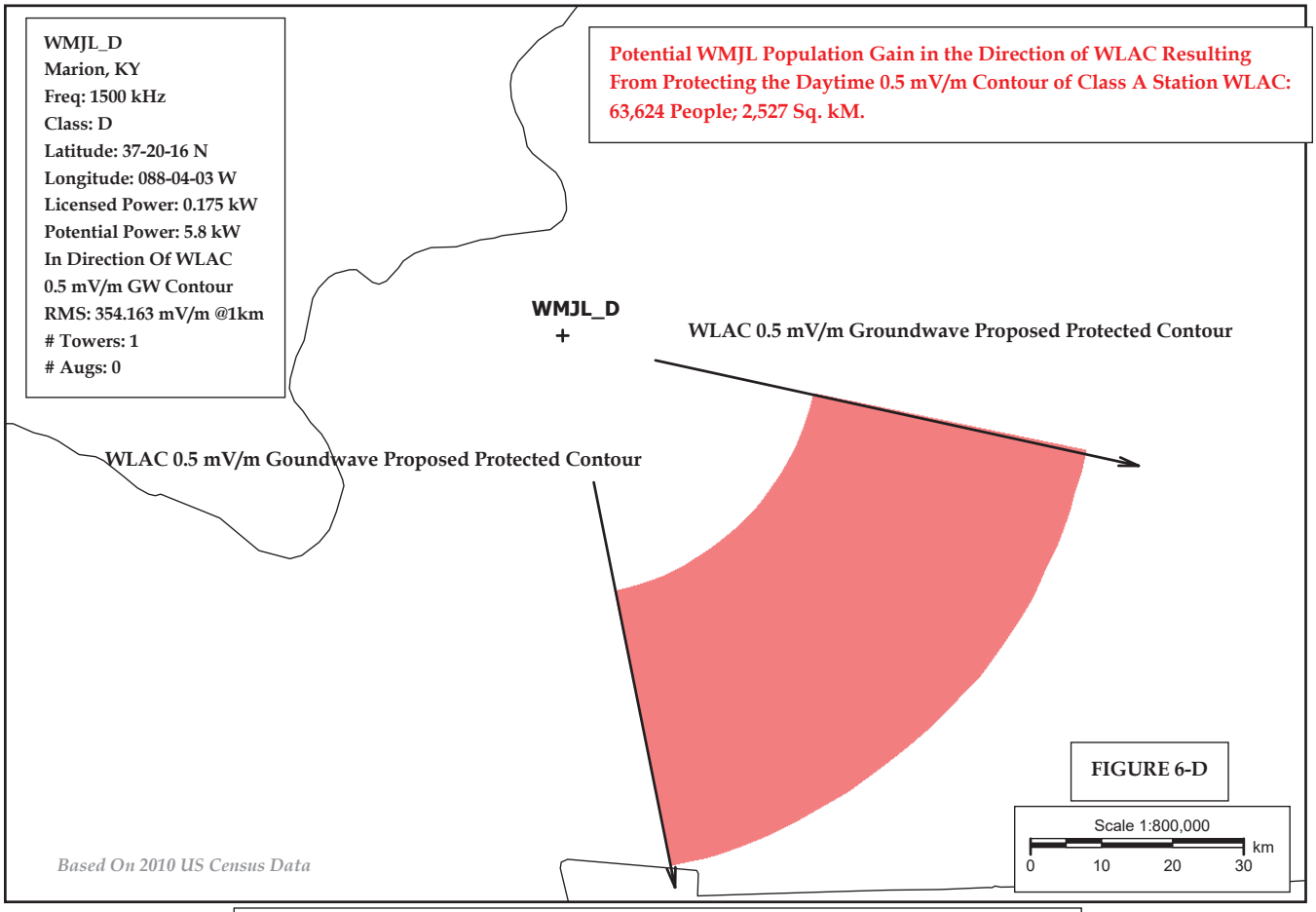
Potential KMRF 0.5 mV/m Gain Area In the Direction of WLAC Resulting From Class A Station WLAC Being Protected to its 0.5 mV/m Groundwave Daytime Contour



Potential WPOT 0.5 mV/m Gain Area In the Direction of WLAC Resulting From Class A Station WLAC Being Protected to its 0.5 mV/m Groundwave Daytime Contour



Potential WDEB 0.5 mV/m Gain Area In the Direction of WLAC Resulting From Class A Station WLAC Being Protected to its 0.5 mV/m Groundwave Daytime Contour



Potential WMJL 0.5 mV/m Gain Area In the Direction of WLAC Resulting From Class A Station WLAC Being Protected to its 0.5 mV/m Groundwave Daytime Contour

WNWS_D
Brownsville, TN
Freq: 1520 kHz
Class: D
Latitude: 35-36-30 N
Longitude: 089-14-40 W
Licensed Power: 0.25 kW
Potential Power: 9 kW
In Direction Of WLAC
0.5 mV/m GW Contour
RMS: 305.838 mV/m @1km
Towers: 1
Augs: 0

Potential WNWS Population Gain in the Direction of WLAC Resulting From Protecting the Daytime 0.5 mV/m Contour of Class A Station WLAC: 99,916 People; 900 Sq. kM.

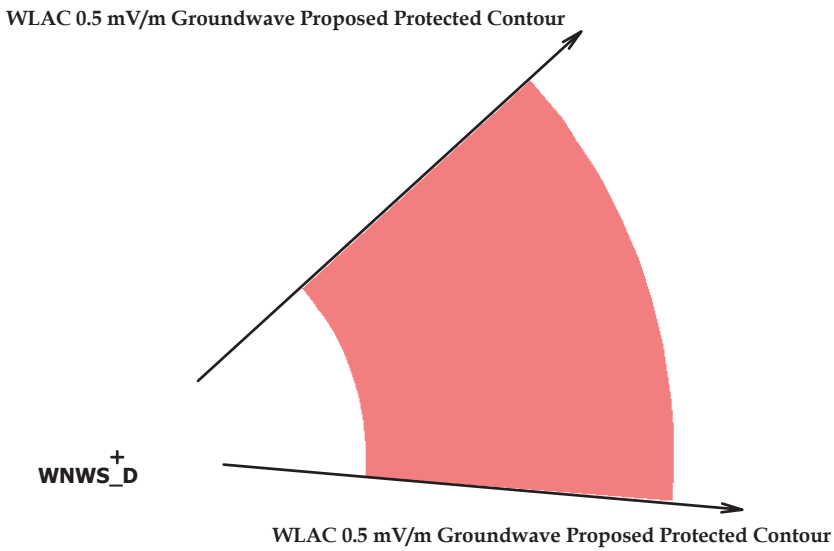


FIGURE 7-D

Scale 1:550,000
0 10 20 30 km

Based On 2010 US Census Data

Potential WNWS 0.5 mV/m Gain Area In the Direction of WLAC Resulting From Class A Station WLAC Being Protected to its 0.5 mV/m Groundwave Daytime Contour

WLAC, NASHVILLE, TENNEESSEE
1510 kHz 50 kW ND
JANUARY 2019

WLAC NIGHTTIME OPERATION

0.5 mV/m 50% Skywave (Presently Protected Contour) Current Population	Interference Caused to 0.5 mV/m 50% Skywave by Maximized Class D Nighttime Operations Per *SFNPRM* Nighttime Alternative 1 (Figure 1-N)	
	Population:	Percentage of Interference to Population Within 0.5 mV/m 50% Skywave:
111,337,140	93,123,113	83.6%

GAIN IN CLASS D STATION'S NIGHTTIME INTERFERENCE FREE CONTOUR SERVICE WITH MAXIMUM POWER IN THE DIRECTION OF WLAC (Figures 2-N through 14-N)

Maximizing Class D Station	Gain by Population (Persons) and Area (square kilometers)	Figure
WWHN	300/0.9	2-N
WYEC	18/4.2	3-N
WJOT	59/0.2	4-N
WLKR	268/6.5	5-N
WQUL	0/0.1	6-N
WQQW	53/6	7-N
KMRF	865/31	8-N
WEAL	1,181/0.7	9-N
WLGN	358/1.7	10-N
KWJB	45/3.2	11-N
KAGC	5,993/6.1	12-N
KAGY	0/1.2	13-N
WWBC	65,095/122.8	14-N

Maximizing Class D Station	Gain by Population (Persons) and Area (square kilometers)	Figure
COLLECTIVE GAIN:	**74,235/184.6**	

NET LOSS IN SERVICE FROM *SFNPRM* NIGHTTIME ALTERNATIVE 1 (CLASS A AM STATION LOSS MINUS COLLECTIVE GAIN IN CLASS D SERVICE):

93,123,113 (Loss of Class A AM Service) – 74,235 (Collective Class D Gain) = 93,048,878 persons Net Loss

WLAC, NASHVILLE, TENNEESSEE
1510 kHz 50 kW ND
JANUARY 2019

WLAC CRITICAL HOURS OPERATION

SFNPRM Alternative 1: No Critical Hours Protections To Class A AM Stations

Critical Hours Time Period	Interference Caused Within Class A 0.1 mV/m Groundwave Contour By Class D Operations With Full Daytime Power			Interference Caused Within Class A 0.5 mV/m Groundwave Contour By Class D Operations With Full Daytime Power		
	Population:	Area (square kilometers):	Percentage of Interference to Population Within 0.1 mV/m Groundwave Contour:	Population:	Area (square kilometers):	Percentage of Interference to Population Within 0.5 mV/m Groundwave Contour:
One Hour Before Sunset (Figure 1.1-C)	75,371	3,007	2%	0	0	0%
One-Half Hour Before Sunset (Figure 1.2-C)	1,512,919	62,992	40.7%	113	28	0.005%
One-Quarter Hour Before Sunset (Figure 1.3-C)	1,904,525	75,384	51.2%	303,639	9,263	14.4%

WLAC CRITICAL HOURS OPERATION

***SFNPRM* Alternative 2: Section 73.190 Critical Hours Figures Revised to Reference Distance From 0.5 mV/m Contour (in Lieu of 0.1 mV/m Contour) of Class A AM Stations**

Critical Hours Time Period	Interference Caused Within Class A 0.1 mV/m Groundwave Contour By Class D Operations Per Alternative 2			Interference Caused Within Class A 0.5 mV/m Groundwave Contour By Class D Operations Per Alternative 2		
	Population:	Area (square kilometers):	Percentage of Interference to Population Within 0.1 mV/m Groundwave Contour:	Population:	Area (square kilometers):	Percentage of Interference to Population Within 0.5 mV/m Groundwave Contour:
One Hour Before Sunset (Figure 2.1-C)	0	0	0%	0	0	0%
One-Half Hour Before Sunset (Figure 2.2-C)	1,258,106	50,819	33.8%	0	0	0%
One-Quarter Hour Before Sunset (Figure2.3-C)	1,667,686	68,688	44.9%	59,067	2,429	2.8%

WLAC, NASHVILLE, TENNEESSEE
1510 kHz 50 kW ND
JANUARY 2019

WLAC DAYTIME OPERATION

0.1 mV/m Groundwave (Presently Protected Contour)		Interference Caused to Class A 0.1 mV/m Groundwave Contour By Maximized Class D Daytime Operations Per *SFNPRM* Daytime Proposal (Figure 1-D)	
Population:	**Area:**	**Population:**	**Percentage of Interference to Population Within 0.1 mV/m Groundwave Contour:**
3,716,454	**92,099 sq. km.**	**826,117**	**22.2%**

GAIN IN CLASS D STATION'S DAYTIME OPERATION IN THE DIRECTION OF WLAC WITH MAXIMUM POWER IN THE DIRECTION OF WLAC (Figures 2-D through 7-D)

Maximizing Class D Station	Gain by Population (Persons) and Area (square kilometers)	Figure
WQUL	195,516/612	2-D
KMRF	18,823/1,844	3-D
WPOT	60,396/2,643	4-D
WDEB	93.247/2,187	5-D
WMJL	63,624/2,527	6-D
WNWS	99,916/1,844	7-D
COLLECTIVE GAIN:	**531,522/11,657**	

NET LOSS IN SERVICE FROM *SFNPRM* DAYTIME PROPOSAL (CLASS A AM STATION LOSS MINUS COLLECTIVE GAIN IN CLASS D SERVICE):

826,117(Loss of Class A AM Service) – 531,522 (Collective Class D Gain) = 294,595 persons Net Loss[1]

[1] This figure represents the net loss assuming upgrades by the listed neighboring Class D stations. Potentially different populations within the studied Class A AM station could be subject to interference depending upon future neighboring upgrades, with up to 1,600,886 persons subject to loss of service (WLAC's 0.1 mV/m daytime contour population of 3,716,454 minus WLAC's 0.5 mV/m daytime contour population of 2,115,568 = 1,600,886).

Grid Based Incoming Interference Population Report

Station Information:

Call: WLAC
Freq: 1510 kHz
NASHVILLE, TN, US
Hours: N
Lat: 36-16-19 N
Lng: 086-45-28 W
Power: 50.0 kW - Custom Q Value Used: 77.95
Theo RMS: 2575.00 mV/m @ 1km @ 50.0 kW
# of Augmentations: 6

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	190.7	0	0	0.0	0.0	0.0	0.0
2	0.526	145.0	90.0	349.0	91.2	0	0	0.0	0.0	0.0	0.0
3	0.526	-51.0	217.0	290.0	91.2	0	0	0.0	0.0	0.0	0.0

#	Azimuth (deg)	Radiation (mV/m@1km)	Span (deg)
1	56.50	482.80	20.0
2	280.00	482.80	26.0
3	293.00	341.66	24.0
4	305.00	362.10	14.0
5	312.00	426.48	14.0
6	321.00	917.33	40.0

Theoretical RMS: 2575.00 mV/m@1km Erss = 3117.81 mV/m@1km
Standard RMS: 2704.99 mV/m@1km Q = 77.95 mV/m@1km
Augmented RMS: 2711.16 mV/m@1km

Study Information:

Calculation Area: SkyWave 500.0 uV/m
Grid Size: 500 x 500
Reference Propagation Model: Groundwave + Skywave
Interference Propagation Model: Groundwave + Skywave
Ratios:
Co-channel: 20.0
First Adjacent: 1.0
Second Adjacent: 0.033
Third Adjacent: 0.033
Ix signals combined using RSS methodology: Yes
RSS Cutoff Percentage: 50.0
Threshold for reception: 0.1 mV/m
Population Database: 2010 US Census (PL)

Summary:

```
       Total Station Coverage: 111,337,140 (  2941595.3 sq. km )
           Total Interference:  93,123,113 (  2608286.3 sq. km )

   Interference Free Coverage:  18,214,027 (   333270.8 sq. km )
```

Stations Causing Interference:

Call Letters	Area (sq. km)	Housing Units	Population
KMRF_N	1,039,754	14,976,565	34,740,049
WWBC_N	950,914	13,377,788	29,123,803
WLKR_N	353,065	12,158,935	27,325,140
WWHN_N	306,264	10,633,015	25,057,752
WJOT_N	233,308	9,354,192	21,240,884
KAGC_N	856,510	7,491,198	18,250,483
KWJB_N	378,539	5,679,010	13,802,332
WYEC_N	128,904	4,220,007	9,981,794
KAGY_N	714,591	4,268,082	9,531,821
WEAL_N	64,026	1,592,246	3,449,704
WQQW_N	111,265	1,276,871	2,855,004
WLGN_N	37,336	1,191,923	2,770,054
WQUL_N	17,672	313,879	709,928

Interference Free Breakdown:

White:	12,321,937	[67.7%]
Black:	3,964,673	[21.8%]
Hispanic:	1,156,162	[6.3%]
Native American:	58,784	[0.3%]
Asian:	416,140	[2.3%]
Pacific Islander:	7,107	[0.0%]
Mixed Race:	262,587	[1.4%]
Other:	26,637	[0.1%]
Total:	18,214,027	

	Housing Units	Population	%
Alabama			
Autauga County			
Total	22,135	54,571	
WLAC Coverage	22,135	54,571	
Ix Free Cov	366	777	1.42
KMRF_N	21,769	53,794	98.58
KWJB_N	31	68	0.12

Grid Based Incoming Interference Population Report

Station Information:

Call: WLAC
Freq: 1510 kHz
NASHVILLE, TN, US
Hours: D
Lat: 36-16-19 N
Lng: 086-45-28 W
Power: 50.0 kW
Theo RMS: 397.50 mV/m @ 1km @ 1kW

#	Field Ratio	Phase (deg)	Spacing (deg)	Orient (deg)	Height (deg)	Ref Swtch	TL Swtch	A (deg)	B (deg)	C (deg)	D (deg)
1	1.000	0.0	0.0	0.0	190.7	0	0	0.0	0.0	0.0	0.0

Study Information:

Calculation Area: GW 0.1 mV/m
Grid Size: 500 x 500
Reference Propagation Model: Groundwave
Interference Propagation Model: Groundwave
Ratios:
Co-channel: 20.0
First Adjacent: 1.0
Second Adjacent: 0.033
Third Adjacent: 0.033
Ix signals combined using RSS methodology: Yes
RSS Cutoff Percentage: 50.0
Threshold for reception: 0.1 mV/m
Population Database: 2010 US Census (PL)

Summary:

Total Station Coverage: 3,716,454 (92098.9 sq. km)
Total Interference: 826,117 (36872.6 sq. km)

Interference Free Coverage: 2,890,337 (55228.4 sq. km)

Stations Causing Interference:

Call Letters	Area (sq. km)	Housing Units	Population
WMJL_D	15,593	185,472	401,984
WDEB_D	12,878	138,328	295,100
WPOT_D	10,038	85,375	169,708
WQUL_D	1,109	9,119	19,946

WQQW	(Not Considered In Report)		
KMRF_D	0	0	0
WNWS_D	0	0	0

Interference Free Breakdown:

White:	2,237,890	[77.4%]
Black:	377,999	[13.1%]
Hispanic:	162,622	[5.6%]
Native American:	8,950	[0.3%]
Asian:	48,847	[1.7%]
Pacific Islander:	2,005	[0.1%]
Mixed Race:	48,657	[1.7%]
Other:	3,367	[0.1%]
Total:	2,890,337	

	Housing Units	Population	%
Alabama			
Jackson County			
Total	24,786	53,227	
WLAC Coverage	491	934	
Ix Free Cov	491	934	100.00
Lauderdale County			
Total	43,791	92,709	
WLAC Coverage	11,278	24,920	
Ix Free Cov	11,278	24,920	100.00
Limestone County			
Total	34,977	82,782	
WLAC Coverage	28,595	68,437	
Ix Free Cov	28,595	68,437	100.00
Madison County			
Total	146,447	334,811	
WLAC Coverage	56,872	142,858	
Ix Free Cov	56,872	142,858	100.00
Illinois			
Hardin County			
Total	2,488	4,320	
WLAC Coverage	385	579	
WMJL_D	385	579	100.00
Massac County			
Total	7,113	15,429	
WLAC Coverage	12	40	
WMJL_D	12	40	100.00
Pope County			
Total	2,491	4,470	
WLAC Coverage	105	222	
WMJL_D	105	222	100.00
Indiana			
Spencer County			